the OIL AND GAS JOURNAL

124 extra ideas in Oil and Gas Journal this week!

TRADE and business publications are one of industry's most important sources of information. And as readers know, these publications not only contain informative material in their editorial sections, but also offer a wealth of *extra* ideas in their advertising pages.

That's why these days, smart readers are giving both parts an extra-thorough combing. With costs on the rise and greater output a must, ideas that help a company boost its efficiency are more valuable today than they have ever been.

In this issue of Oil and Gas Journal, there are 124 advertisements, many of them containing ideas that may help *your* business. And if you manufacture or buy machinery of any kind, we believe you'll find helpful information in the Timken® tapered roller bearing advertisements that appear regularly in this publication. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

GEARED TO GREATER GOALS!

The big manufacturing plant at Halliburton's headquarters is geared to reach the new goals set by increased oil production. Master craftsmen are teamed with modern machinery to manufacture the major portion of equipment, tools, and supplies used in Halliburton's services.

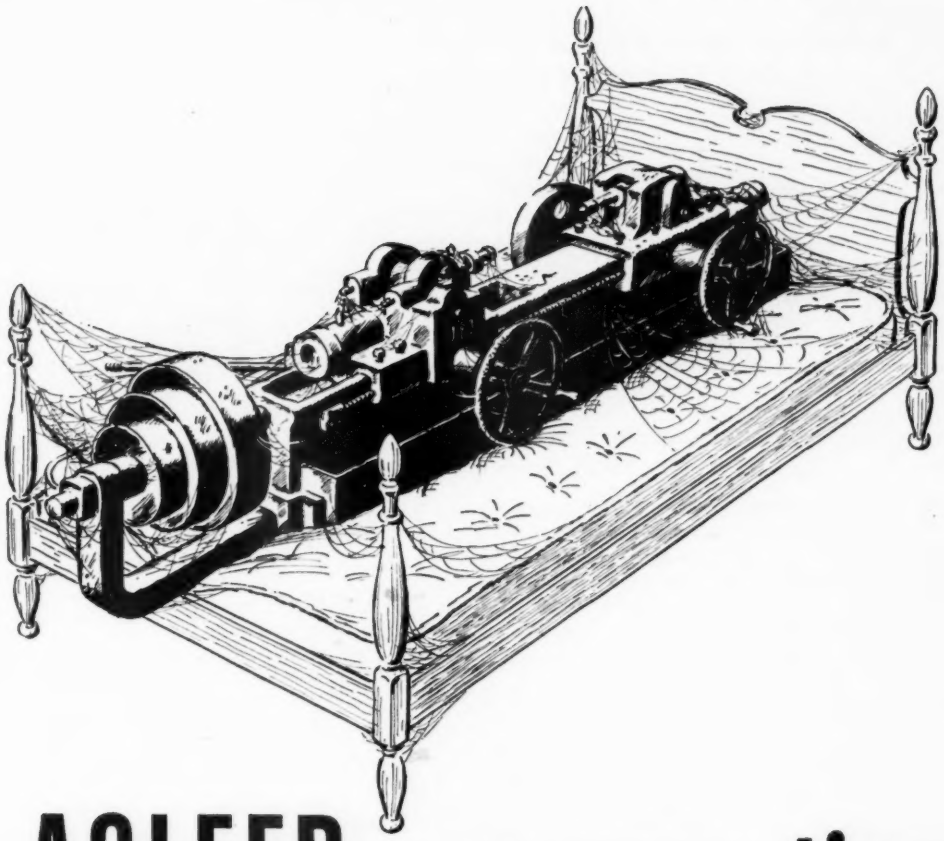
Their unswerving pride of craftsmanship, supported by 25 years' energetic research and million-well experience, is your assurance that Halliburton's equipment will continue to be especially accurate, dependable, and efficient as deeper wells are drilled and greater temperatures and pressures are encountered.

"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"

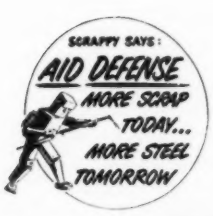
HALLIBURTON

OIL WELL CEMENTING CO.

DUNCAN, OKLAHOMA



ASLEEP...on your time



An obsolete or worn-out machine, stuck away, sleeping and forgotten in a corner of your plant, is costly.

It is not doing you or anyone else any good. It is taking up valuable space.

Call in a scrap dealer and let him haul away your dormant scrap. It will help to supply the tons of additional scrap that is needed if the country's steel furnaces are going to continue working at full capacity.

Today there are millions of tons of dormant scrap hidden away in plants and factories, and on farms.

If the steel mills can get that scrap, the steel supply picture will be very much brighter, with more steel for everybody. Call in a scrap dealer today!

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

More Scrap Today... More Steel Tomorrow

The Oil and Gas Journal, published Mondays, copyright 1952, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

William M. Barret, Inc.

in observing its 25th Anniversary of service to the petroleum and mining industries, is pleased to announce the wider availability of

RADOIL

for exploration and field definition

Another in a series designed to explain the function and application of the RADOIL method.

RADOIL*

WHAT IS RADOIL?

RADOIL* is a geophysical technique employing electromagnetic energy in the form of radio waves to locate and define oil-bearing strata. It provides a method of mapping directly the *location, outline* and *depth* of oil-saturated zones in any of the known forms of structural, stratigraphic and lithologic traps.

The RADOIL method is the cumulative result of more than 15 years of intensive laboratory and field research. Both experimental and commercial projects have utilized from one to six RADOIL crews continuously since 1936, with commercial operations predominating for the past 10 years.

Results demonstrate conclusively *that RADOIL is more reliable in determining the presence of oil than conventional geophysical methods are in indicating structural conditions favorable for the accumulation of oil.*

This does not mean that RADOIL will replace other geophysical techniques. On the contrary, it is employed more profitably in areas where preliminary exploratory surveys have been made. The primary function of RADOIL is to bridge the wide gap that now exists between a structural *prospect* and a worthwhile *oil field.* In this application, *RADOIL is competitive only with the drill.*

An adaptation of the RADOIL method, known as RADORE, has recently been developed and is proving successful in the direct location and definition of ore deposits.

In the past year six RADOIL crews and two RADORE crews have been in commercial operation, but more trained crews, and increased facilities for manufacturing field equipment, now make possible the wider availability of both RADOIL and RADORE.

INQUIRIES INVITED

GIDDENS-LANE BUILDING

WM. M. BARRET, INC.

Shreveport, Louisiana

* Trade Mark and Service Mark Registered U. S. Patent Office

You get MORE CAPACITY *with a* FANMIX BURNER

Increase Boiler Ratings On Present Or Planned Equipment

In all types of Coppus-Dennis FANMIX Burners — straight gas or combination gas-oil — we utilize the energy of the fuel under pressure to drive the burner fan and deliver air in the proper proportion to the fuel flow. This exclusive "pinwheel action" *mechanically* mixes fuel and air in exactly the right proportions for truly radiant, non-luminous heat.

The result is uniform temperature everywhere in the combustion chamber — no drifting "hot spots" — and complete combustion under all conditions. That's why you can release more heat into your present furnace — why in new installations you get more heat into smaller furnace space.

FANMIX Saves On Both Old and New Installations

FANMIX can easily be operated with your present furnace and stack, requiring only minor changes in other equipment. Or if you're planning on new boilers, remember that FANMIX relieves the furnace from the burden of mixing, creates its own forced draft and takes smaller pipe sizes. Which means you can plan on reduced combustion space, less stack, no forced draft equipment and lower installation costs all around.

Get the Whole Story

Coppus engineers FANMIX Burners to meet individual requirements, providing complete control over heat pattern and combustion . . . Learn more about how "pinwheel action" can step up *your* boiler performance to peak efficiency and economy — as it is doing throughout industry. Send for Bulletin 410-6. Coppus Engineering Corp., Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" Products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, and MINING CATALOGS.

COPPUS ENGINEERING CORP.
265 Park Ave.
Worcester 2, Mass.
Please send Bulletin 410-6 to:
Name .....
Company .....
Address .....
City ..... Zone ..... State .....

For Economical, Dependable Rotation of Your Drilling String

USE AMERICAN IRON

Hex or Square

KELLYS!

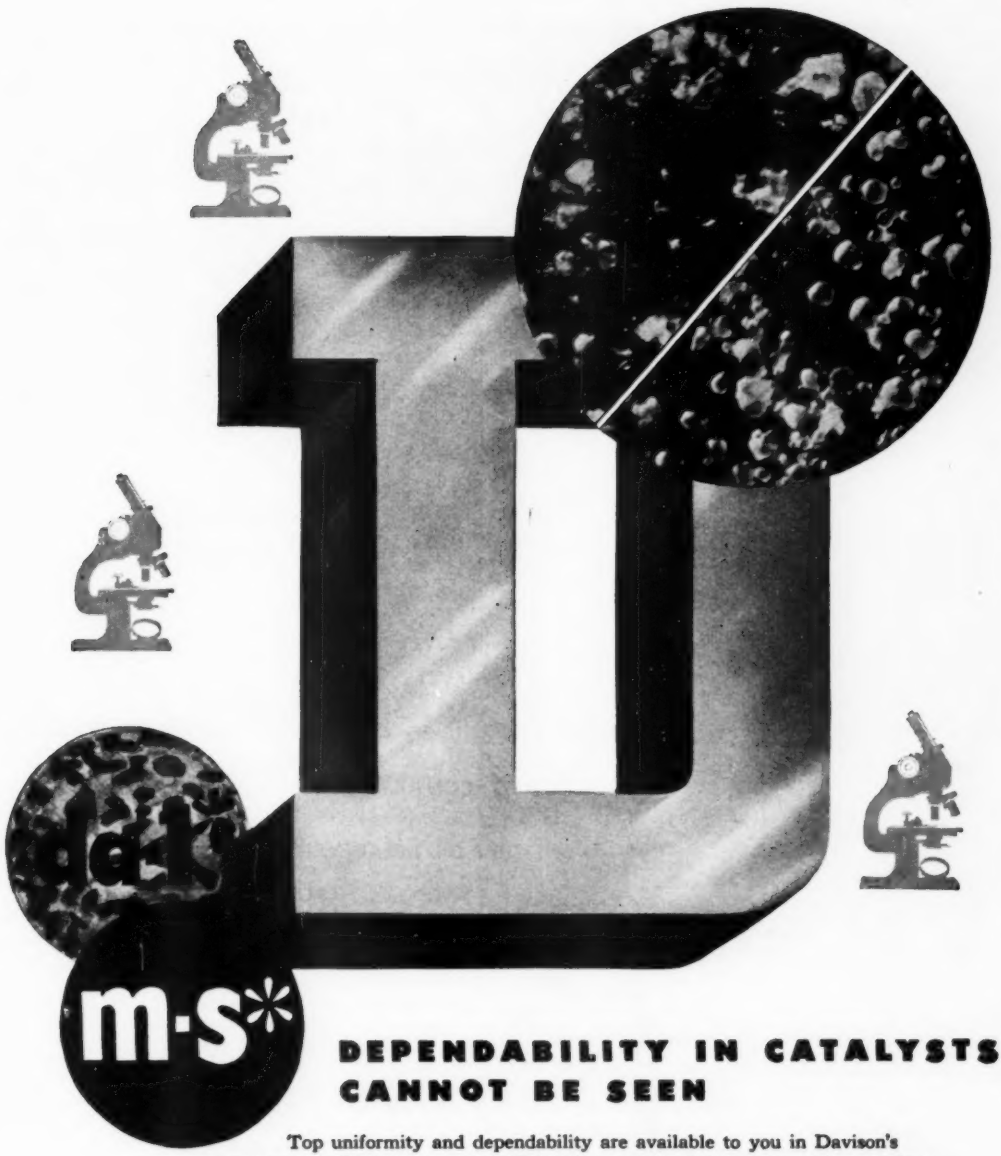
HEX KELLYS

American Iron Hex Kellys are made from fully heat treated alloy steel forgings for longer wear and greater resistance to torsional stresses. Driving surfaces are machine finished—and circulation holes precision bored—for smoother running and proper balance at all drilling speeds. Our manufacturing processes and scientific inspection insure straightness, joint alignment, concentricity of bore, hardness and precision threaded connections.

SQUARE KELLYS

American Iron Square Kellys are also made from a heat treated one piece alloy steel forging with top and bottom integral upset ends formed during the forging operation. The radius on the square of the driving surface is correctly formed during the forging operation. Correct forging processes plus straightness, joint alignment, concentricity of bore, hardness and precision threaded connections, make the American Iron Square Kelly the best balanced square kelly available.

BALANCED FOR SMOOTH RUNNING at all drilling speeds



DEPENDABILITY IN CATALYSTS CANNOT BE SEEN

Top uniformity and dependability are available to you in Davison's microspheroidal (M-S*) or ground (DA-1*) synthetic fluid-type cracking catalysts. The accompanying photomicrographs show the physical characteristics of the DA-1 and new M-S catalysts produced in Davison's Cincinnati plant. Uniform physical and catalytic characteristics result from Davison's modern facilities and years of technical experience and research. Experienced Davison Field Service Engineers—complete laboratory facilities—are all part of Davison Dependability—Dependability with the big "D".

*T.M.T.D.C.C.

Progress Through Chemistry

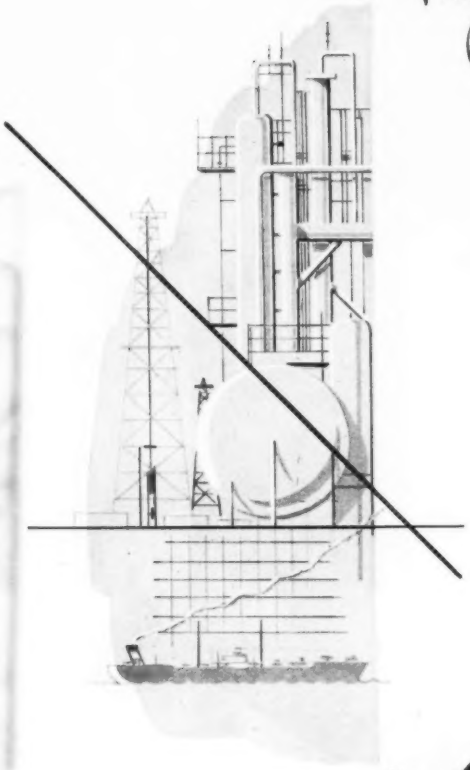
THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS

a Progressive Bank

IS CONTINUALLY INTERESTED
IN THE ECONOMIC
DEVELOPMENT AND
CONSERVATION OF THE
NATION'S NATURAL RESOURCES.



You are cordially Invited
TO CONSULT WITH
OUR OIL DEPARTMENT.

THE
CITY NATIONAL
BANK
OF HOUSTON

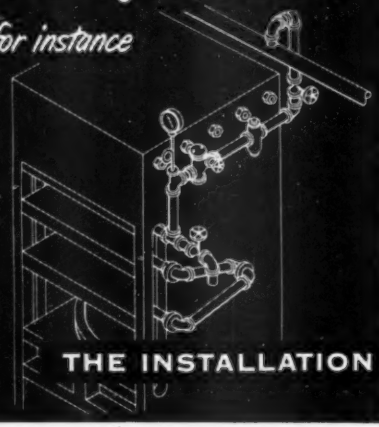
Member Federal Deposit Insurance Corporation

CAPITAL AND SURPLUS FIFTEEN MILLION DOLLARS

Will Your Pressure Regulators Last 25 Years?

...on Molding Press Service

for instance



THE INSTALLATION

Crane Brass Pressure Regulators on steam lines to rubber molding presses; Dryden Rubber Division, Sheller Mfg. Corp., Chicago. 225 units in service.

VALVE SERVICE RATINGS

FEATURES:	Equally good on steam or air
SUITABILITY:	Steady outlet pressure - No drift
MAINTENANCE COST:	Routine servicing only
SERVICE LIFE:	Many installed more than 25 years — Still O.K.
OPERATING RESULTS:	Fully automatic steam control at lowest cost
PRICE:	Good Buy - has no equal
AVAILABILITY:	Stock item in Crane Line

THE HISTORY

Steam generated at 130 psi is reduced through individual regulators on molding presses. Pressure used at machines is 60 to 100 psi depending on work. Features of regulator service needed most are: (1) non-fluctuating outlet pressure automatically maintained within close regulation; (2) easy adjustment by press operator to specified pressure for given work.

More than 25 years ago the plant standardized on Crane Regulators, a total of 225 being in use today. Many are the original installations, still delivering desired outlet pressure. Records for all regulators regardless of age, show no maintenance cost other than prescribed simple routine servicing. On old models of the Crane 960 regulator, after prolonged service, this includes occasional regrinding of seats.

THE VALVE

Crane No. 960 Brass Pressure Regulators reduce steam or air pressures up to 250 psi, to within 80% of inlet pressure. Factory pre-set to operate within any of 4 ranges from 1 to 200 psi, with easily selected service pressure within set range. Precision made; fully automatic; highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for full data.

The Complete Crane Line Meets All Valve Needs. That's Why—

More Crane Valves Are Used Than Any Other Make!

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois

Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

YOUR BEST BET

TURBO JET

HALLIBURTON'S newest development in FLOATING and GUIDING EQUIPMENT

Turbo-jet, the best yet, contributes far more toward 100% satisfactory casing cementing jobs. Not only does it float and guide casing strings safely to bottom but it also provides a forceful jetting action of fluids that gives a thorough, equal distribution of cement around the shoe with minimum channeling.

Rotor speeds ranging from 1200 to 3000 r.p.m. develop a terrific jetting and turbulent action. Approximately 40% of the slurry, shot out through side ports at a 45° downward pitch, churns the upthrust main current of slurry speeding through the end of the casing guide shoe.

This exclusive Halliburton principle jets off more mud cake from the hole wall, penetrates bridges while running casing, accurately distributes cement, and circulates fluids through side ports even when casing rests on bottom.

Halliburton's Plastic Turbo-Jet shoe is so precision-built that Rotors have shown no indication of wear after handling fluids under high pressures for 26 continuous hours. All parts are made of drillable material.

Next time get Turbo-Jet, Halliburton's newest development in Floating and Guiding Equipment. Phone your nearest Halliburton representative. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

NO MATTER WHAT YOU NEED, HALLIBURTON HAS IT
IN ALL SIZES AND TYPES WITH STANDARD A.P.I. OR SPECIAL THREADS

Cement Guide and Float Shoes
Plastic Guide and Float Shoes
Admix Safety Collars and Shoes
Turbo-Jet Plastic Guide & Float Shoes

Float Collars
Baffle Collars
Casing Shoes
Liner Set Shoes
Coupling Shoes

HALLIBURTON

YEARS AHEAD IN FLOATING EQUIPMENT

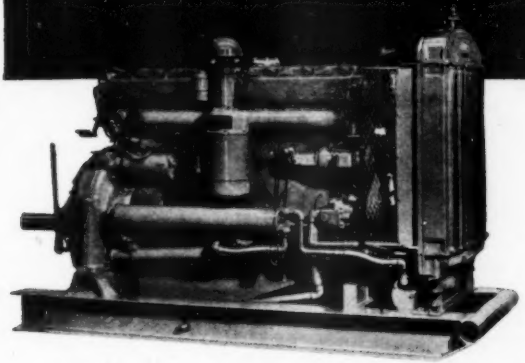
MURPHY DIESEL...

gives you easier starting . . .

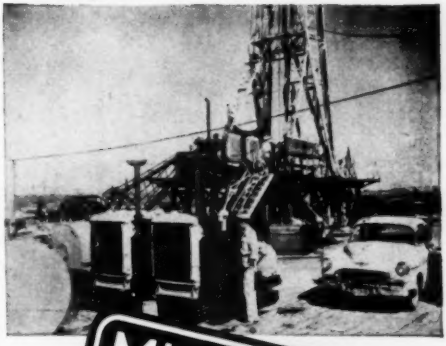
more economy . . . smoother

operation . . . better response

***because it has* UNIT FUEL INJECTION**



Another Murphy powered rig about ready to get under way. This one is owned by Carl U. Perry, Drilling Contractor, Freeport, Texas.



The performance of a diesel engine can be no better than the accuracy of control of fuel injection. That's why we say the unit injector is the heart of the Murphy Diesel. This simple, self-contained unit is both pump and nozzle. There are no high pressure fuel lines to interfere with smooth, accurate, precisely controlled fuel injection and rob you of power and fuel. In the Murphy Diesel, solid fuel completely atomized as a fine fog is injected directly into all parts of a plain, open combustion chamber. Ignition is accomplished solely by the heat of compression of the air within the cylinder. The precisely controlled rate of injection determines the speed and pressure of combustion, hence the power delivered and the amount of fuel used.

Translated into benefits for the user, Murphy Unit Fuel Injection makes possible greater power output with less fuel—better all around performance. Full details are given in the booklet *"10 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL COMPANY
5305 W. Burnham St., Milwaukee 14, Wisconsin
TULSA OFFICE—Sales, Parts, Service:
113-117 South Elwood Street, Tulsa, Oklahoma

Sales, Parts and Service: Los Angeles, California; Mt. Vernon, Illinois; Evansville, Indiana; Great Bend, Kansas; Jackson, Michigan; Tulsa, Oklahoma; Amarillo, Dallas, Houston, Lubbock and San Antonio, Texas; Edmonton, Alberta, Canada.

MURPHY DIESEL

215

Heavy duty power
for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

TEAMWORK IS ALWAYS BETTER

CROWN BLOCKS

TRAVELING BLOCKS

SWIVELS

ROTARIES

That's why "Oilwell" Companion Drilling Equipment does a better job faster, at lower cost

THE crown and traveling blocks, swivels and rotaries shown here were designed and engineered to work together.

Each member of these "Oilwell" drilling "teams" is rated to operate with the capacities of its companion pieces, and each works most efficiently when used with them. Drilling is fast, wear is even, maintenance and repair time cut to a minimum—you get maximum service at the lowest cost.

OIL WELL SUPPLY DIVISION
UNITED STATES STEEL COMPANY

Executive Office—DALLAS, TEXAS
Export Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Area Offices — CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

Branches Serving All Oil Fields

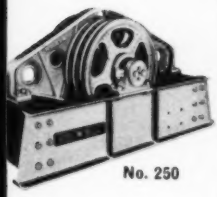
USS

"OILWELL"

TRADE MARK

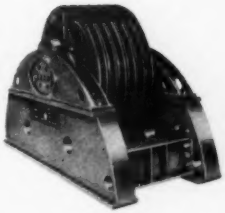
UNITED STATES STEEL

to 7,500 ft.	to 10,000 ft.	to 12,500 ft.	deeper than 12,500 ft.



No. 250

No. 360



No. 500

No. 580

66-inch

No. 300

No. 400

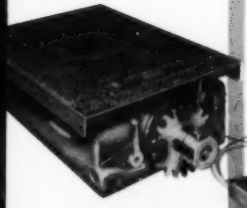
No. 480

No. S4-100

No. S5-200

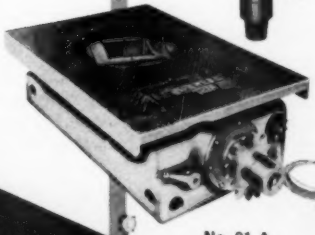
No. S6-300

No. S8-400

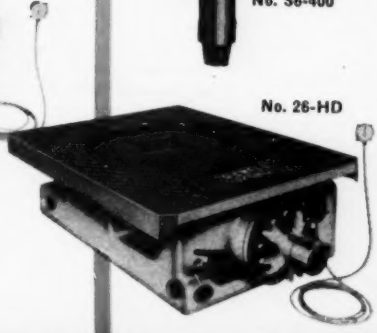


No. 17½-C

No. 20½"



No. 21-A



No. 26-HD

Oil makes him an industrialist...

On the farms of America a big job is being done – growing the food to feed millions. It demands enormous skill and effort from the farmer, and dependable power and performance from the machines he uses. The development of many of these machines – which have helped turn farmers into industrialists – has been greatly helped by petroleum research. In fact, there is more horsepower on the farms than in all the nation's factories. And both modern farming and petroleum progress have been achieved, largely, by men working competitively in a system of free enterprise.

The Texas Company has served the farmers of America for many years – and hopes to continue to an even greater extent in the future.

The Texas Company

TEXACO

Faithfully yours for Fifty Years
1902 1952

BY USING WOLVERINE TUBE

By being careful in selecting a good tube for your condensers in the first place, you can reduce tube breakdowns—and consequent downtime, which is always costly.

By installing Wolverine condenser tube—the tube that is quality-controlled from ore to finished product—you relieve yourself of much worry. You can rely on its giving dependable performance far above average expectancy.

Always specify Wolverine tube for your condensers and heat exchangers, thus making sure that the tube you select is of the proper copper base alloy which will meet the conditions peculiar to your operations. If you require any assistance in making such selections, feel free to call on us. We're always ready to help.

WOLVERINE TUBE DIVISION
Calumet & Hecla Consolidated Copper Company
INCORPORATED
Manufacturers of seamless, nonferrous tubing
1459 Central Avenue • Detroit 9, Michigan

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York 16, N. Y.

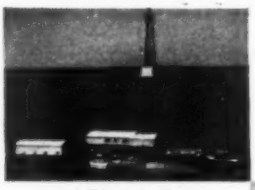
integrity

Avondale

service...

famous in the Oil Industry

A company is not only famous for what it does—but also for how it does it! AVONDALE has constructed, repaired, and fabricated for the Oil Industry for many years. AVONDALE barges, towboats, tugboats, drilling barges, personnel launches and offshore drilling platforms have made a name for themselves within the Oil Industry as being tops in Quality and Performance. But that's not all! AVONDALE'S satisfied customers within the Oil Industry, both large and small companies, are proof that AVONDALE integrity, the manner in which AVONDALE carries out a job to the letter, to the complete satisfaction of the customer, is something that has made customers return to AVONDALE time and again. Couple those two words, Integrity and Service, and you have the ultimate in what the Oil Industry needs and wants from a company rendering Service to them . . . . . .



Offshore Drill Rig

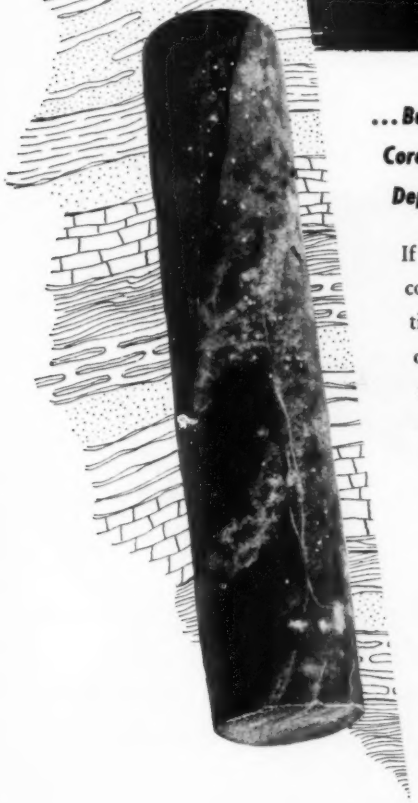
125' MV "JOAN E."

Oil Cargo Barge

AVONDALE MARINE WAYS, Inc.

MAIN PLANT: AVONDALE, LA. • QUICK REPAIR PLANT: HARVEY, LA.
SERVICE FOUNDRY DIVISION (SERVICE FOUNDRY): NEW ORLEANS, LA.

NOT JUST A MUDCAKE SAMPLE



...But A Natural, Un-compressed, Un-contaminated Core of Formation—Hard Dense Lime—Cut From A Specified Depth With An A-1 Rotary-Type Side Wall Core Barrel

If you want, and expect to get a complete and proper core analysis, you must have a natural core of the formation to start with. Such cores can be taken only by cutting out the formation as you drill, or by taking it from the side wall of open hole with a core cutting tool. Cores of formation in its natural state in the ground, can be taken *uncompressed by explosive forces, uncontaminated by wall mudcake,* and (by testimony of core analysis laboratories) *in more than sufficient amount for every analytical test* with the A-1 Rotary-Type Side Wall Core Barrel.

A-1 engineers, knowing that mud is often caked greater than one inch thick on the side wall, have designed a tool which reaches deep into the formation. In past operation the A-1 Rotary-Type Side Wall Core Barrel has taken cores which average 5.8" in length with a diameter of 1¼".

A-1 BIT & TOOL COMPANY

2000 HUSSION STREET • BOX 2133 • CHarter 7611 • HOUSTON

DISTRICT OFFICES AND SERVICE POINTS:

TEXAS
Beaumont
Corpus Christi
Kilgore
Midland
Victoria

CALIFORNIA
Los Angeles
Baash-Ross Tool Co.

LOUISIANA
Houma
Lafayette
Lake Charles
New Orleans

MISSISSIPPI
Brookhaven

OKLAHOMA
Duncan
Oklahoma City

WYOMING
Casper
W. A. Posey (Sure-Shot) Baash-Ross Tool Co. (Sidewall Cores, Milling, Side Tracking, and Burris Key Seat Wiper)

ILLINOIS
Olney
Baash-Ross Tool Co.

CANADA
Calgary and Edmonton
Import Tool Co.

EXPORT REPRESENTATIVES:

SOUTH AMERICA:
C. R. Summers, Avila Hotel, Caracas, Venezuela

NEW YORK, N. Y.
Beckley, Haltom & Hickman
30 Rockefeller Plaza

ARGENTINA:
Langley y Cia.
Corrientes 1115
Buenos Aires

NEAR & FAR EAST
W. O. Calvert
20 Copthall Ave.
London E. C. 2
England

MEXICO
J. E. Douglas
2nd Natl. Bank Bldg.
Houston, Texas

MAIL COUPON NOW

A-1 BIT & TOOL CO., P. O. BOX 2133, HOUSTON, TEXAS

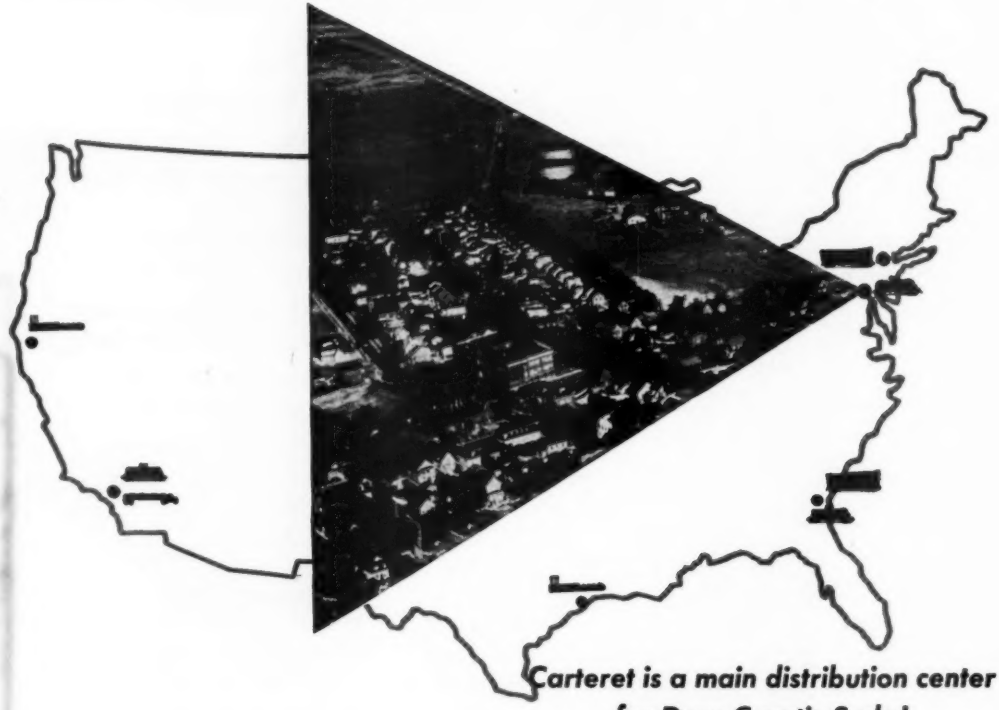
Gentlemen: Please send me your latest operation data on the A-1 Side Wall Core Barrel.

Name_____

Address_____

City_____ State_____

How close are you to Carteret, N.J.?



Carteret is a main distribution center for Dow Caustic Soda!

Dow's distribution facilities are conveniently located to serve you with dependable caustic soda delivery! Dow caustic soda solution is shipped from bulk tank terminals in Los Angeles, California; Carteret, New Jersey and Charleston, South Carolina. Caustic soda solid, flake and ground flake are shipped from terminals in Port Newark, New Jersey; Chicago, Illinois and Charleston, South Carolina. Dow caustic soda production is shipped to these distribution centers from three large plants—in Michigan, Texas and California. For superior service and nationwide distribution facilities . . . look to Dow for dependable caustic soda delivery!

wherever you are... *you're close to*

DOW CAUSTIC SODA

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Atlanta • Cleveland • Detroit
Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto 1, Canada

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

There'll be some new twists below 20,000

It has been calculated that in a 10,000-foot hole the drill string will make eight full turns before the bit itself begins to move—2880° of twisting in 10,000 feet of drill pipe and joints.

When that drill string is withdrawn, the first ten feet or so to clear the hole represents the stretch in 10,000 feet of pipe.

However familiar this stretching and twisting in drill pipe may be to the driller and his crew, a 10,000 foot "driveshaft" was not always so commonplace. Long before pipe capable of rotating a rock-bit at 10,000 feet could be manufactured, metallurgists and chemists and engineers were spending lifetimes analyzing and estimating what stresses and strains would be set up.

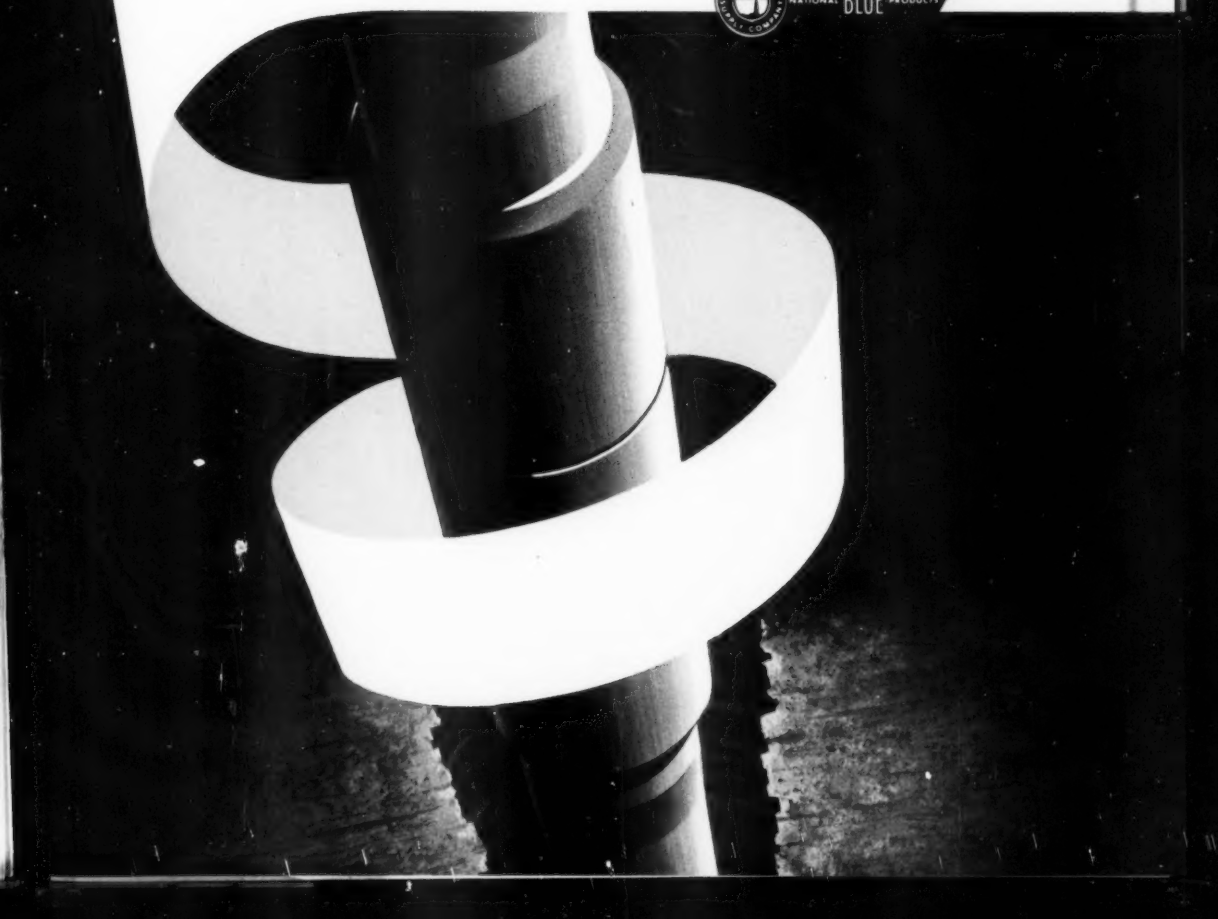
In the future, as the bits penetrate below 20,000 feet still other twists and stretches must occur. No one knows exactly what will happen to a drill string more than four miles inside the earth, but Spang researchers in oil country tubular products are already anticipating the probable conditions and developing drill pipe capable of driving the bit however deep the search for oil may go.

And, when this drill pipe for extra-deep drilling passes its many laboratory and oil field tests, you'll find it under the Spang name at your nearby National Supply Store, where you'll also find everything else that's new and everything that's standard in oil field equipment.

THE NATIONAL SUPPLY COMPANY

General Sales Offices: Toledo, Ohio

NATIONAL BLUE PRODUCTS



For maximum drill string performance...

drill pipe and tool joints by

SPANG

Spang research in both the strong and weak points of drill pipe performance reached one of its important milestones with the development and introduction of Spang Double Seal Shrink Thread Drill Pipe and Tool Joints.

The Spang method of metallurgical control of seamless pipe and the mechanical precision of the double metal-to-metal seals on the tool joints combined to help correct the major operating problems.

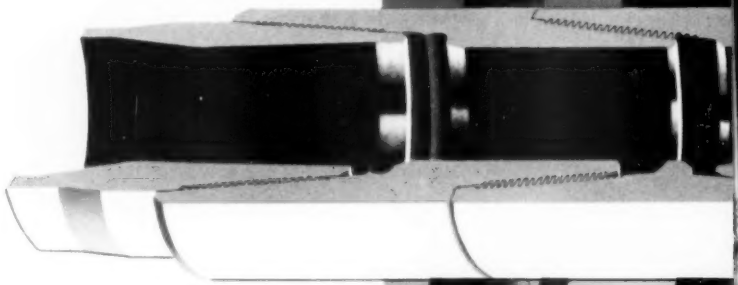
The serviceability of Spang Double Seal Shrink Thread Drill Pipe and Tool Joints is a matter of record in every oil field. And these records emphasize the savings in operating cost, in comparison with conventional drill pipe.

But research in oil country tubular goods never stops at Spang-Chalfant. Investigations in the field and in the laboratory next were focused on the deeper and deeper drilling operations which necessitated longer and more costly strings.

Out of this program came still another important Spang product—Spangweld Drill Pipe, a welded combination of pipe and tool joint with simplified assembly features.

Spangweld Drill Pipe is produced under complete and undivided manufacturing control, from steel billet to final tool joint weld. Spang experience in drill pipe problems resulted in the development of Spangweld Drill Pipe as a companion product to Double Seal Shrink Thread Drill Pipe.

The advantages of Spangweld Drill Pipe are already well-known. Even more important, however, is the fact that drill pipe suitable for every type of drilling is produced under the Spang name because Spangweld Drill Pipe and Spang Double Seal Shrink Thread Drill Pipe will satisfy the requirements for any drilling operation, anywhere. Bulletins describing both types are available on request.



Spang-Chalfant Division

THE NATIONAL SUPPLY COMPANY

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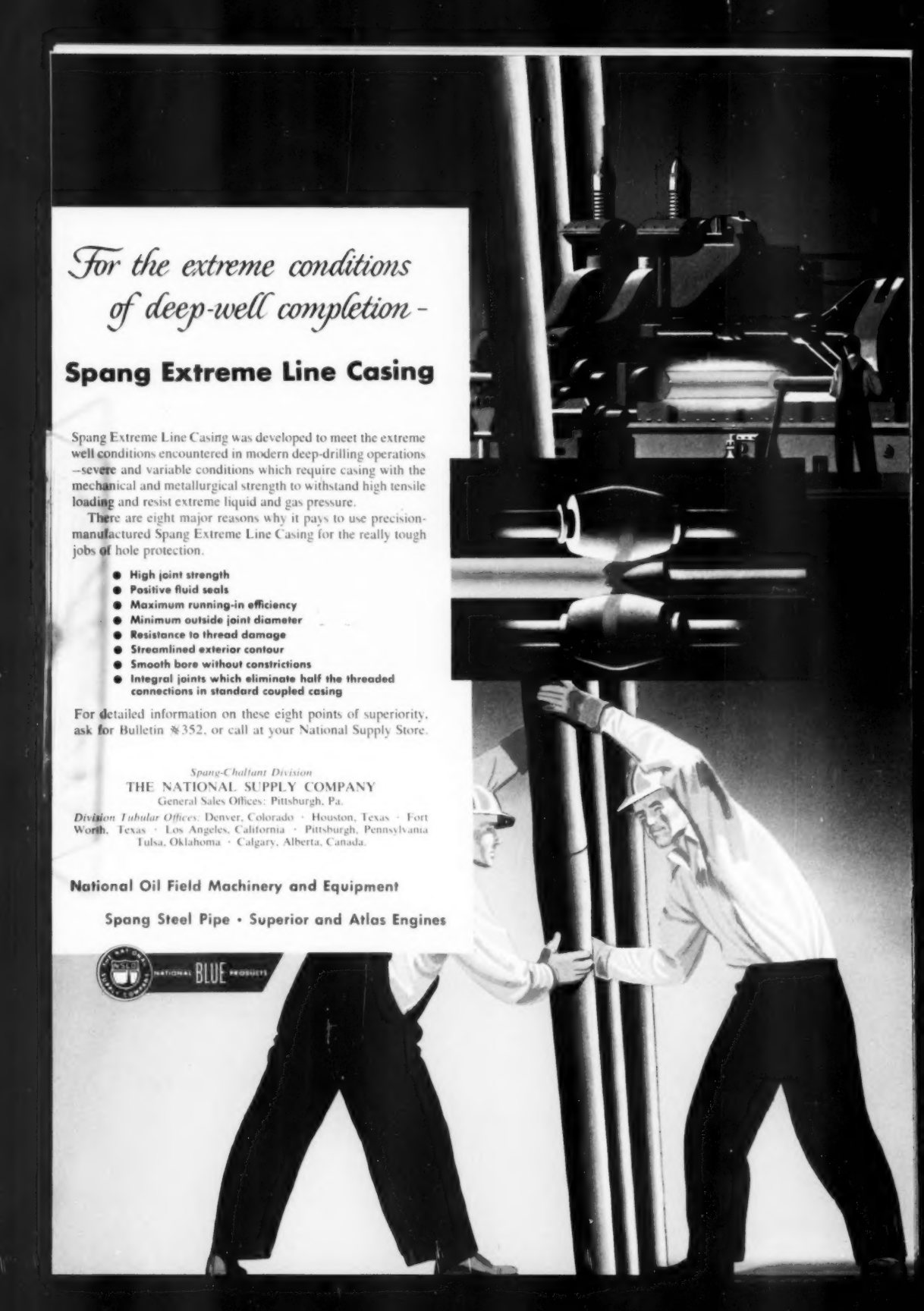
Division Tubular Offices: Denver, Colorado · Houston, Texas · Fort Worth, Texas · Los Angeles, California · Pittsburgh, Pennsylvania Tulsa, Oklahoma · Calgary, Alberta, Canada.

NATIONAL BLUE PRODUCTS

National Oil Field Machinery and Equipment

Spang Steel Pipe • Superior and Atlas Engines



For the extreme conditions of deep-well completion –

Spang Extreme Line Casing

Spang Extreme Line Casing was developed to meet the extreme well conditions encountered in modern deep-drilling operations –severe and variable conditions which require casing with the mechanical and metallurgical strength to withstand high tensile loading and resist extreme liquid and gas pressure.

There are eight major reasons why it pays to use precision-manufactured Spang Extreme Line Casing for the really tough jobs of hole protection.

- **High joint strength**
- **Positive fluid seals**
- **Maximum running-in efficiency**
- **Minimum outside joint diameter**
- **Resistance to thread damage**
- **Streamlined exterior contour**
- **Smooth bore without constrictions**
- **Integral joints which eliminate half the threaded connections in standard coupled casing**

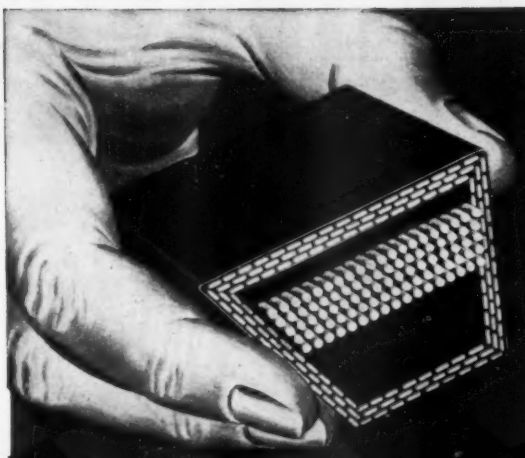
For detailed information on these eight points of superiority, ask for Bulletin #352, or call at your National Supply Store.

Spang-Chaltant Division
THE NATIONAL SUPPLY COMPANY
General Sales Offices: Pittsburgh, Pa.
Division Tubular Offices: Denver, Colorado · Houston, Texas · Fort Worth, Texas · Los Angeles, California · Pittsburgh, Pennsylvania Tulsa, Oklahoma · Calgary, Alberta, Canada.

National Oil Field Machinery and Equipment

Spang Steel Pipe • Superior and Atlas Engines

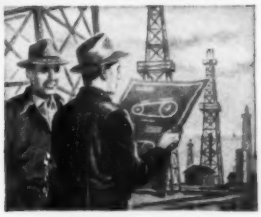
NATIONAL BLUE PRODUCTS



Smart Move in the OIL FIELD

Dependable Dayton Drives

Convenient Warehouse Stocks



Field Engineering Service

No doubt about it—one of the wisest moves a drilling superintendent can make is to put Dayton Thorobred V-Belts on his rig. For wherever oil wells are drilled, cost-conscious operators have found that husky Thorobreds are the trouble-free V-Belts for mud pumps . . . rotary . . . every power transmission job.

Why? Well, look at those sturdy *cords!* They're continuous filament, high tenacity rayon—processed on Dayton's exclusive electronic train. And that rugged *cover* is made of rubber filled all weather "Hi-Twist" fabric. No wonder these belts have such a reputation for long life!

Get in touch with the Dayton Distributor or Warehouse in your area. You'll agree it's one of the wisest moves you ever made.

© D.R. 1952

DAYTON RUBBER COMPANY, DAYTON 1, OHIO

V-Belts by Dayton Rubber

Since 1905

WORLD'S LARGEST MANUFACTURER OF V-BELTS

What a CARDWELL PARTS

EDMONTON
ALBERTA, CANADA

CASPER
WYOMING

MT. PLEASANT
MICHIGAN

GREAT BEND
KANSAS

WICHITA
OFFICE and PLANT

McLEANSBORO
ILLINOIS

LONG BEACH
CALIFORNIA

OKLAHOMA CITY
OKLAHOMA

ODESSA
TEXAS

SHREVEPORT
LOUISIANA

HOUSTON
TEXAS

CORPUS CHRISTI
TEXAS

STOCK *means to you!*

CARDWELL factory-owned parts stocks are strategically located near the oilfields of the United States, Canada, and foreign countries. These parts stock stores are operated by trained men who know the parts and have a genuine interest in servicing all the Cardwell rigs in their locality. Each parts stock store has individual parts books covering every rig in their service territory. Parts books in Spanish and English are supplied with rigs shipped to Latin American countries.

The most important item in the operation of any drilling or servicing rig is efficient, convenient parts service. Down-time usually costs many times the price of the required part. Cardwell parts stocks are factory owned in order that proper inventory be kept on hand to insure prompt service.

With thousands of Cardwell rigs working in the oilfields of the world, there is a Cardwell responsibility to be performed to every user. We have hundreds of rigs more than twenty years old that are being promptly serviced. No Cardwell rig ever becomes an orphan. Hundreds of old Cardwell rigs are still producing profits for their owners.

PARTS STOCK STORES . . .

ATLAS SUPPLY COMPANY, 1314 Mission, Mt. Pleasant, Michigan
BEARING & TRANSMISSION COMPANY, 214 N. Market, Shreveport, Louisiana
MIDWEST EQUIPMENT COMPANY, 1420 W. Second St., Odessa, Texas
SERVICE PARTS COMPANY, 3409 W. Tenth St., Great Bend, Kansas
SMITH & THORP, 141 E. Anahein St., Long Beach, California
SPECIALTIES WAREHOUSE SERVICE, 1703 N. Port, Corpus Christi, Texas
VOERSTER, E. F., 910 S. E. Twenty-Ninth St., Oklahoma City, Oklahoma
MID-EAST SUPPLY & MACHINE COMPANY, 107 S. W. Sixth St., Fairfield, Illinois
WESTERN OIL TOOL COMPANY, Casper, Wyoming
DIXIE EQUIPMENT SUPPLY COMPANY, 7313 Almeda, Houston, Texas

FOREIGN PARTS STOCK STORES . . .

RIG SERVICE & PARTS, LTD., Municipal Airport, Edmonton, Alberta, Canada
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NEAL & MASSY ENGR. CO., LTD., Trinidad, B. W. I.
OFICINA TECNICA STUBBINS, C. A., Apartado No. 5, Puerto La Cruz, Ven.
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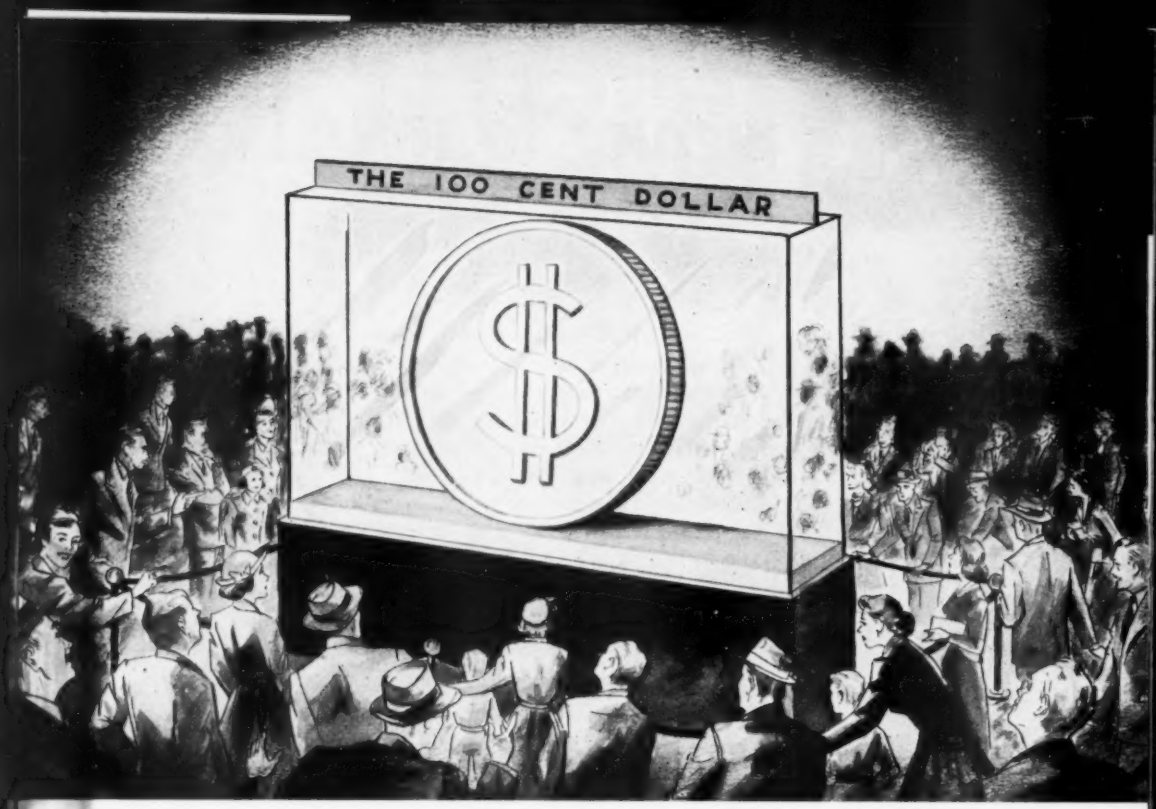
NEW YORK, N. Y.
Export Division

CARDWELL
REG U S TRADE MARK PAT OFFICE
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

CARDWELL MFG. CO. INC.

P. O. Drawer 2001 . . . Long Distance Telephones 128—129—130
Cable Address: "ALL STEEL," Wichita — "CARDSTEEL," New York
Wichita, Kansas, U. S. A.

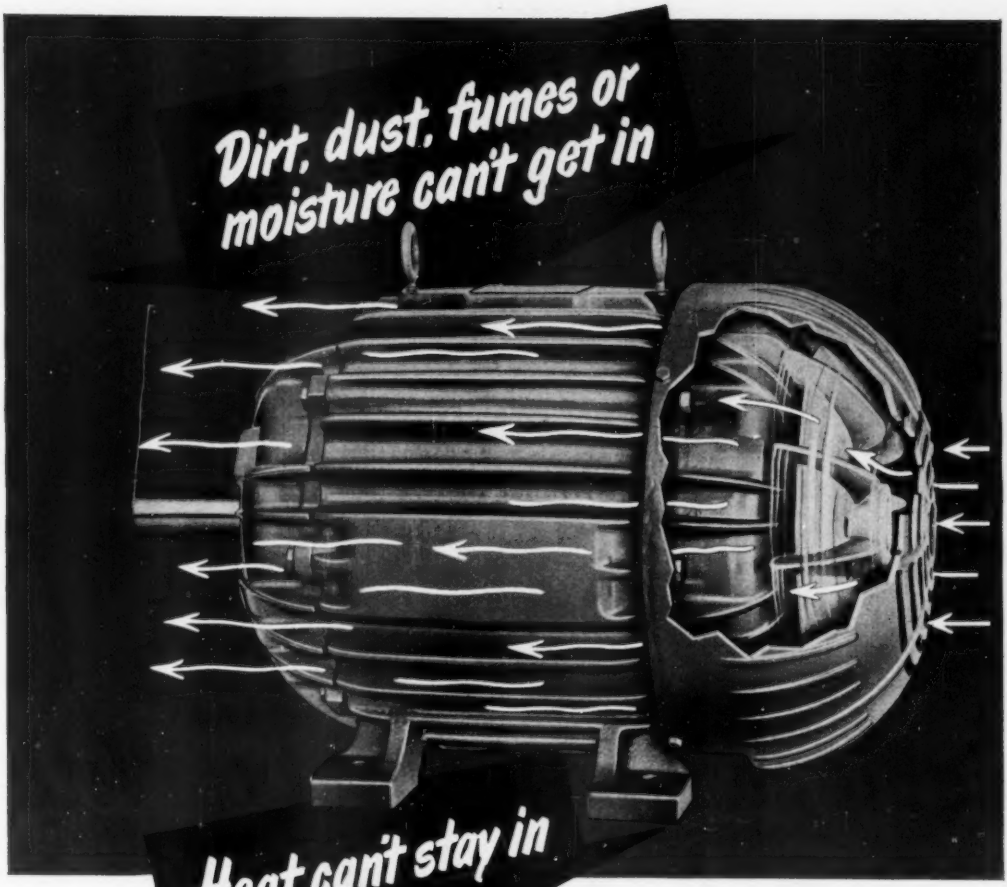


Who Says the 100 Cent Dollar Is a Museum Piece?

. . . Actually, the American Dollar buys *more* in Halliburton cementing service today than it did in 1924!

Erle P. Halliburton

Chairman of the Company
HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma



ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

Here's a motor that doesn't care how tough the conditions are. Blizzards of dust or grit can't affect it—not only can't get *in*, but can't even stay *on* the outer case. The powerful fan-driven, cowl-directed air blast sweeps it off, and also drives off the heat radiated from the many fins.

Easy to see why this Sealedpower motor has **for eleven years** been the ace-in-the-hole among engineers who are confronted with drive conditions that would defeat ordinary motors.

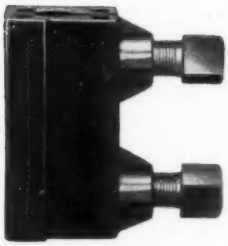
Thousands now in service, and going strong in oil refineries, lumber mills, chemical and textile plants, outdoor and indoor installations everywhere. 3 to 125 hp. Also as explosion-proof underwriters approved in most ratings. Get the facts. Address Elliott Company, Jeannette, Pa., or your nearest Elliott district office.

ELLIOTT COMPANY
Crocker-Wheeler Division
AMPERE, N. J.

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES
ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY
General Offices & Main Plant — Jeannette, Pa.

W2-8

RATIGAN NO. 219
WIRE LINE CLAMP



RATIGAN NO. 204
POLISHED ROD GRIP

RATIGAN NO. 212
BLOWOUT PREVENTER

Equipped For Safety With
RATIGAN

NO. 204 POLISHED ROD GRIP is designed to accommodate present types of pumping units which require a short and narrow gripping device of high quality. It is 6½" high, approximately 2½" wide and weighs 18 pounds. The No. 204 is made in two sizes; one for 1⅛" and 1¼" polished rod, the other for 1½" polished rod. Both sizes have holding capacity of 53,000 pounds.

NO. 219 WIRE LINE CLAMP is the latest Ratigan development in clamping devices and a set of two has holding capacity of 80,000 pounds. The No. 219 is designed for any trunnion type pumping equipment and will take any size wire line from ¾" to 1¼" inclusive.

NO. 212 BLOWOUT PREVENTER is designed for maximum safety and convenience in operation. It also can be used for swabbing or running rods in wells that head, or flow, in the course of operations. Manufactured of high-pressure electric steel, it is comparatively light in weight . . . weighs only 41 pounds; has a high capacity of 3,000 pounds; and is equipped with Ratigan's new type retractable rubbers. The No. 212 is made in 2" and 2½" sizes which can be supplied both plain and upset, male and female or double female. It is also manufactured in a 3" size which is male and female only. However, it can easily be converted to double female unit by installing a 3" collar on the male connection.

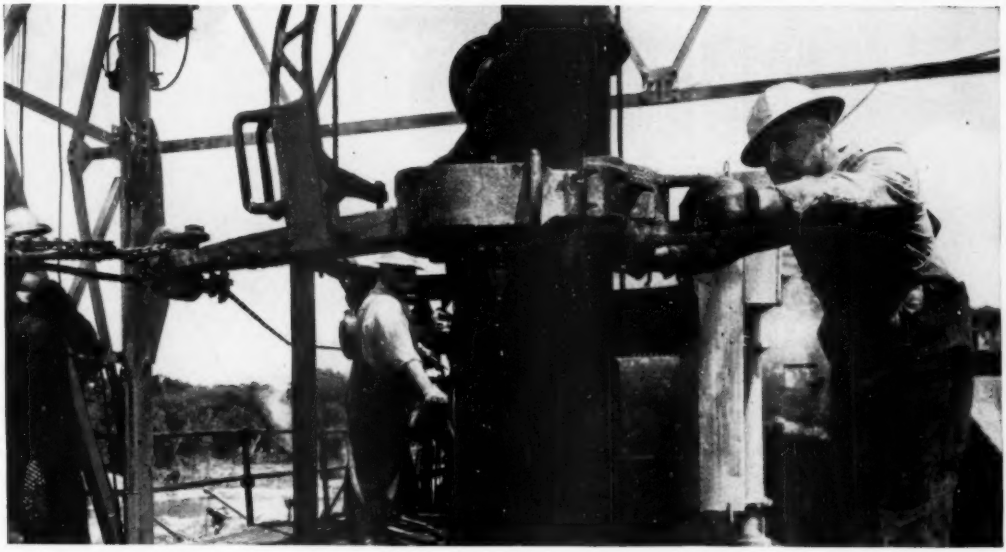
For complete information on ALL Ratigan Equipment, refer to the latest edition of the Composite Catalog.

J. P. RATIGAN, Inc.

1213 Santa Fe Ave., Los Angeles 21, Calif.

Export: National Supply Company, Inc. (Export Division)
600 5th Avenue, New York 20, N. Y.

RATIGAN PRODUCTS ARE DISTRIBUTED THROUGH LEADING SUPPLY STORES



REMINDERS OF GOOD CASING PRACTICES:

How to Test for Proper Make-Up

A supplemental method for determining the effectiveness of make-up is to place the bare hand on the coupling at frequent intervals; when the proper method is being used, the coupling will get uniformly warm. A hot spot on the coupling is an indication of galling.

Reprinted by permission from "API Recommended Practice RP5CI. Care and Use of Casing, Drill Pipe and Tubing."

REPUBLIC Electric Weld Casing and Tubing

★ Make Up Fast
★ Resist Collapse
★ Resist Pull-Out

These oil country tubular products are uniformly round, uniformly strong, uniformly straight, and uniform in wall thickness. Each length is cold-formed from high ductility steel, fully normalized for uniform structure. Casing is cold sized to further increase its high yield strength. Clean, full-formed threads stab, spin-in and tong-up fast . . . and tight. The uniform depth of tough steel under thread roots all around the pipe protects against pull-outs. Literature on request. Write:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Dept.: Chrysler Building, New York 17, New York

REPUBLIC *Electric Weld*
NORMALIZED CASING AND TUBING

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes

keeping a tool joint "jumping"

for twice the usual service with Airco Hardfacing Alloys

Tool joint killers: Increased drilling depths — higher penetration rates—faster rotating speeds — these are the factors that add dollars to drilling and maintenance costs.

Unless — Airco Hardfacing Alloys are given the job of holding expenses to a minimum. For with these shock and abrasion-resistant alloys you may double your tool joint life—even under the toughest drilling conditions. And of extra importance: Not only is wear greatly reduced but correct box end diameters are maintained.

If you're being faced today with tool joint problems, there's an Airco representative near you who can help. Just write or phone your local office for the information you need.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

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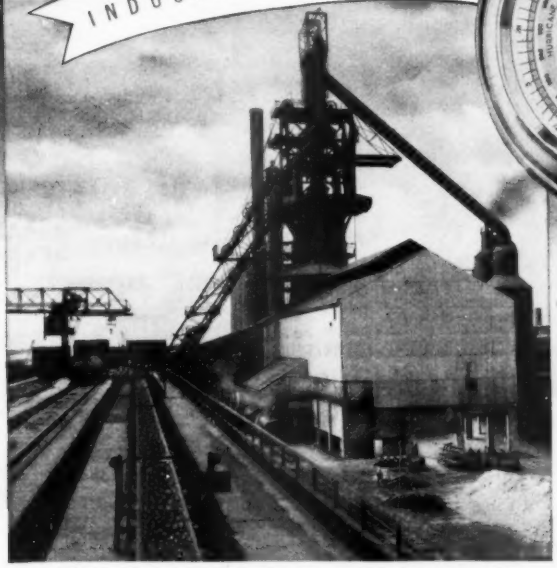
DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

Steel

BULWARK OF FREEDOM AND...

BAROMETER OF INDUSTRIAL WEATHER



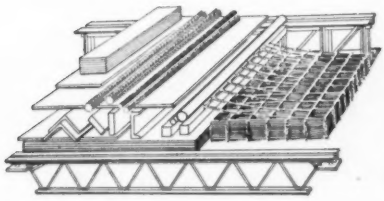
Sheffield Blast Furnace—First to utilize Texas iron ore and coke from Oklahoma coal in a fully integrated at-home steel making operation.

Look at the activity of steel making and you look at a dependable business forecast.

West of the Mississippi and East of the Rockies, good business weather has long been reflected in the ever expanding facilities and activities of Sheffield Steel.

Within the last ten years, Sheffield's at-home steel making capacity has more than doubled. Sheffield Steel has expanded into a fully integrated at-home steel making operation from mining the raw materials to mill finished and fabricated steel products.

Look at the Sheffield customer list and you see the names of the leaders in manufacturing, agriculture, transportation, construction, oil, etc. With them, Sheffield Steel is proud to march in step with the greatly accelerated growth of what very aptly has been termed—the inner stockade of the garrison for freedom.



Sheffield Steel Shapes Up Many Ways For Production and Construction

For manufacturers there is merchant steel—plates, sheets, and bars of all shapes, bolt products, nails, tacks, spring wire and other wire products. For the construction industry there are special products — crescent bars and welded wire mesh for reinforcing concrete, structurals and long and short span open web joists.

SHEFFIELD STEEL CORPORATION
HOUSTON KANSAS CITY TULSA
SUBSIDIARY OF ARMCO STEEL CORPORATION

IRON AND STEEL SCRAP MEANS .....

MORE STEEL FOR AMERICA
More Money In Your Pocket!

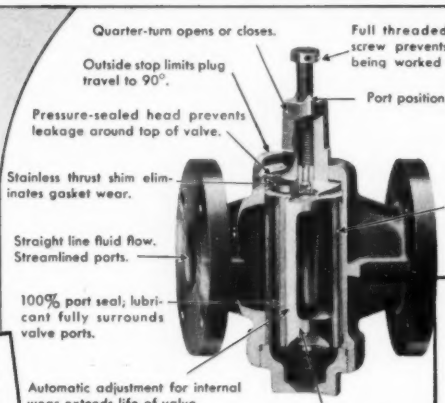
GET YOURS OFF TO THE DEFENSE LINES NOW!

We Make ALL Types of PLUG VALVES

ONE OF THEM IS THE RIGHT VALVE FOR YOUR NEEDS

HOMESTEAD-REISER "Self-Seald" LUBRICATED PLUG VALVES

Straight-way—
Worm & Gear Operated

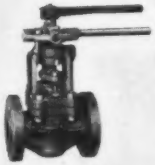

Quarter-turn opens or closes.
Full threaded lubricant screw prevents dirt from being worked into valve.
Outside stop limits plug travel to 90°.
Port position indicator.
Pressure-sealed head prevents leakage around top of valve.
Stainless thrust shim eliminates gasket wear.
Self-Seald — Wedge action of divided plug gives extra tight seal against leakage.
Straight line fluid flow. Streamlined ports.
100% port seal; lubricant fully surrounds valve ports.
Automatic adjustment for internal wear extends life of valve.
Sealing surfaces protected from corrosive or erosive line fluids.

Flow Changer—
Non-lubricated

HOMESTEAD CAM-SEALD
(dry seat)

HOMESTEAD LEVER-SEALD
(quarter turn)

Straight-way—
Flanged or Screw Ends



Straight-way—
Flanged or Screw Ends

How the Amazing "Self-Seald" Principle Works

Homestead-Reiser's patented "Self-Seald" principle is, we believe, the simplest and most effective sealing principle yet developed for lubricated plug valves.

In addition to a full lubricant seal around the ports, and around the top and bottom of the valve, the wedge-action of the divided plug under line pressure, causes the finely-finished surfaces of both segments of the plug to press outward against the sealing surfaces of the body.

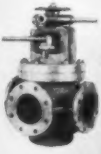
This self-sealing action keeps the plug surfaces in contact with the mirror-like bore of the body. The plug automatically adjusts itself for wear, thus assuring extra long life and maximum leakless service.

For complete information, sizes and prices, write for Catalog 39-5. No obligation.

Three-way—
Screw or Flanged Ends

Four-way—
Flanged or Screw Ends

Four-way— Flanged or
Screw Ends



Three-way— Flanged or
Screw Ends

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. BOX 403 *"Serving Since 1892"* CORAOPOLIS, PA.

GIVE YOUR OPERATOR THE OUTFIT

● Throughout the nation's oil fields, you'll find popular Bucyrus-Erie cable and hydraulic Bulldozers and Bullgraders on the job — digging slush pits, carving out access roads, backfilling . . . building dykes . . . grading around wells.

HE'LL GIVE YOU THE OUTPUT

BUCYRUS ERIE

BULLGRADERS and BULLDOZERS

With an easy-to-handle Bucyrus-Erie Bulldozer or Bullgrader your operator has a digging tool that's designed to give him the most in work capacity and safety — at a minimum of effort. For example:

He Sees What He's Doing . . . The operator can see exactly what the blade is doing — and stay seated. No superstructures to obstruct his vision.

. . . Is In Complete Command Center of gravity is kept low for greater stability when working on steep banks. Also with tractor balance point kept practically intact, blade doesn't tend to nose over at the edge of the dump, tractor works at top efficiency.

. . . And Comfortable Single, four-position hydraulic control lever is within easy reach of the operator, yet does not interfere with tractor controls. Winch control levers for cable-operated blades are easy to operate — conveniently located.

In addition, Bucyrus-Erie Bullgraders can be angled and tilted by the operator in a few minutes without special tools. Lubrication points are easily accessible. Your International Industrial Tractor distributor will be happy to give you full details.

34T52

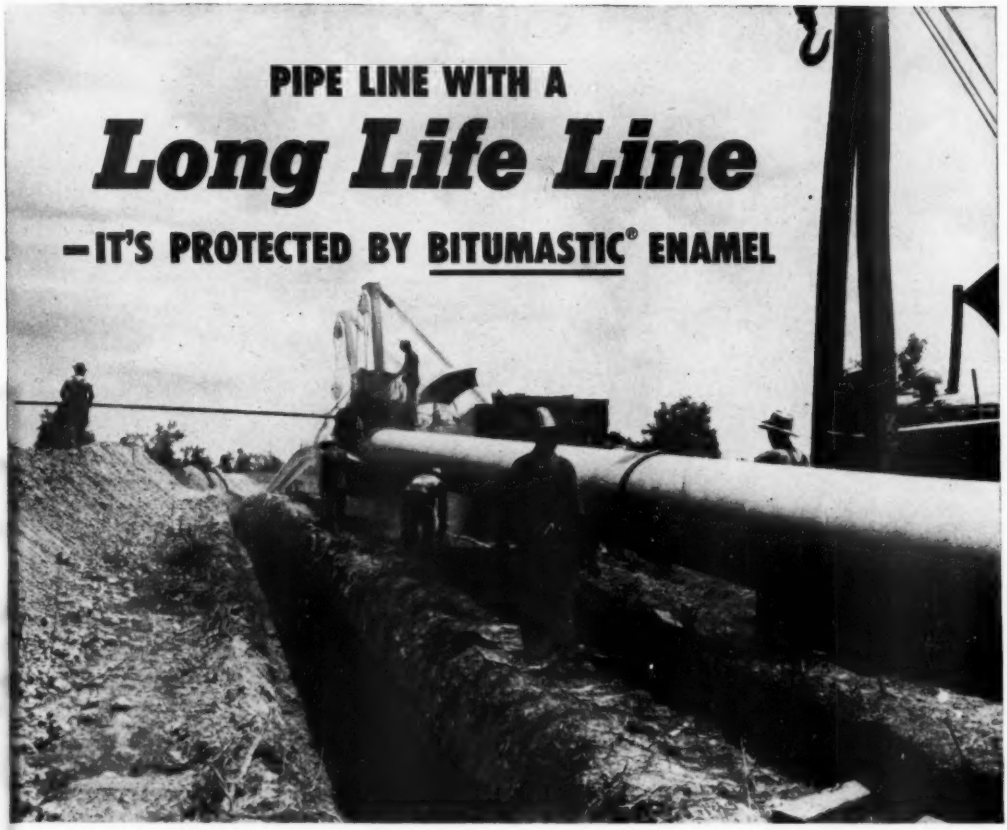
See Your INTERNATIONAL Industrial Tractor Distributor

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

PIPE LINE WITH A

Long Life Line

—IT'S PROTECTED BY BITUMASTIC® ENAMEL



This pipe line was coated with Bitumastic Enamel—then wrapped.

HERE'S a steel pipe line that's almost completed. And once in service, this line will *stay* in service because it's protected by Bitumastic Enamel against severe corrosive conditions.

Bitumastic Enamels give pipe lines the best possible protection against all kinds of corrosion. Here's one reason: through the years these coal-tar enamels *keep* moisture away from pipeline surfaces, thus preventing corrosion. Two more reasons: these durable enamels don't disintegrate with age; they are chemically resistant to soil elements.

Because of Bitumastic Enamels, many oil and gas pipe lines laid 20 and 30 years ago are still giving good service today. Specify Bitumastic Enamels for your next pipe-line project, and give it the same effective protection. Your Koppers representative will give you complete details and estimates.

Bitumastic Enamels soon available from Koppers new California Plant!

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 403-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

You can't get caught in this trap!

NO threads to gall or freeze
NO leaky seals
NO doubt about strength—conforms to all codes
NO multi-bolt flanges
NO thing to drop

That's UNIBOLT

Self-Sealing Gasket—made of Hycar (oil and gas resistant rubber)—is the final answer to scraper trap leaks. Its lipped design makes it self-sealing under line pressure. The coupling cannot be overtightened to the extent of damaging the gasket or the coupling itself.

Release two bolts. Swing the trap open. Take the pig out or put the pig in. Close the trap and tighten two bolts. That's just how simple and easy it is to operate a UNIBOLT Scraper Trap. An oversize barrel (slightly larger than the o.d. of the pig) makes it equally easy to start a pig. Line pressure does the heavy work.

Pipeliners everywhere are using UNIBOLT closures and couplings for scraper traps, blowdowns, strainers, mist removers and other large diameter pressure vessels. A UNIBOLT representative will gladly explain the advantageous features of these products to you.

THORNHILL - CRAVER CO.

P. O. BOX 1184 **HOUSTON, TEXAS**

Tournadozer with *does more oil field*

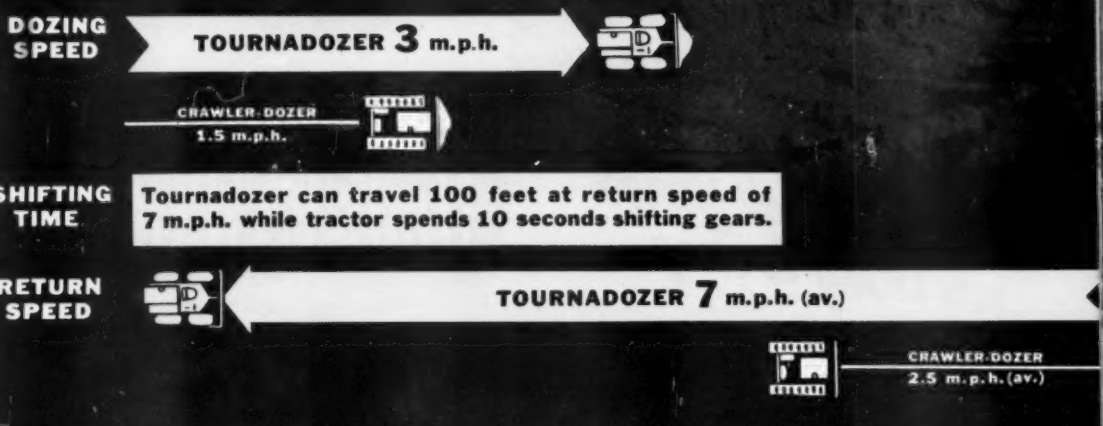
WITH Tournadozer you "run" instead of crawl . . . get around your lease fast, handle a variety of earth-moving, pushing, hauling or skidding jobs. Combination of rubber tires, instantaneous speed selection, plus 186 horsepower, give you high speeds never before available in an oil field dozer.

You get 4 speeds forward, up to 19 m.p.h. — two speeds in reverse up to 8 m.p.h. These high speeds save important minutes on pipeline backfilling, leveling drill sites and digging slush pits. You will cover more jobs per day and make more efficient job-to-job moves. You drive direct, via highway, down rail tracks, or cross country . . . no trailer is necessary to shift from one drill site to another.

Also, you get far more use from Tournadozer's high-speed range because you can change into higher gears without stopping or losing momentum. You maneuver much faster, get into position faster and hold your momentum throughout the load cycle for maximum production. On dozing work, Tournadozer usually averages 2 to 3 cycles to a crawler's one.

To estimate the savings these fast operating units will make on your next contract job, contact your LeTourneau Distributor. Or, write direct for new Tournadozer bulletin.

Increased speeds plus instantaneous shift cut



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R. G. LeTOURNEAU, INC., *Peoria, Illinois*

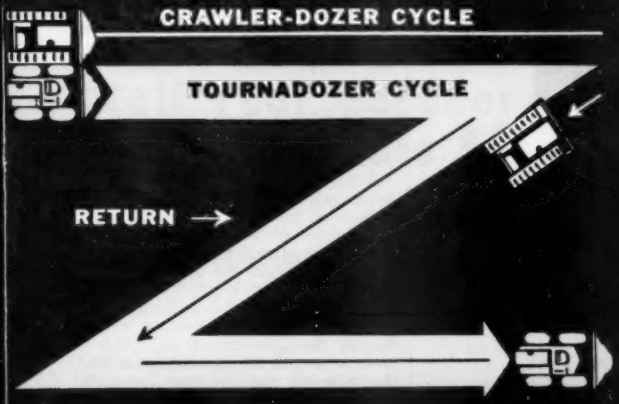
HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

speeds to 19 m.p.h.

jobs

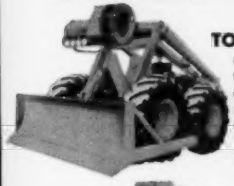
Tournadozer's constant-mesh transmission gives you instant speed selection at the flick of a switch and permits faster travel with full blade and immediate reversal of directions for faster dozing cycles. Optional torque converter provides maximum horsepower at all speeds, eliminates shock loads between engine and power trains.

non-productive dozer time

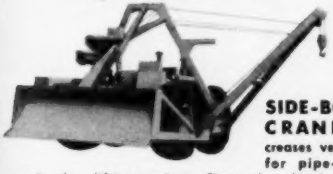


Yellow travel path indicates complete cycle with high-speed Tournadozer. White travel path indicates fraction of cycle done in same time by slow-moving crawler.

Increasing oil field utility



TOURNASKIDDER'S 67,000-lb. line pull through an electrically-operated winch attachment can skid drilling equipment and help hauling trucks through muddy roads.



SIDE-BOOM CRANE increases versatility for pipe-laying and other lifting projects. Finger-tip, electric, power control for up and down movements.

ANGLEDOZER and down-pressure attachment are also available.

Tournaskidder—Trademark D-103-al
Angledozer, Tournadozer—Trademark Reg. U. S. Pat. Off.

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To: R. G. LeTOURNEAU, Inc., Peoria, Ill. Please send me additional information on the 186 h.p. C Tournadozer.

☐ Specifications ☐ Price ☐ Delivery ☐ Where to see

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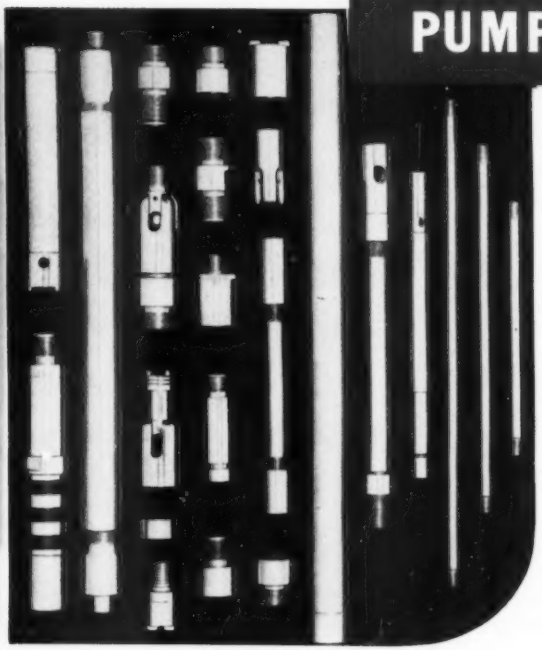
STREET _____ CITY, STATE _____

WHAT IS *Interchangeability?*

NOAH WEBSTER SAYS: *"admitting of mutual substitution . . .*

Pacific Says: "conservation of critical materials and your dollars by reducing your inventory investment 30-35% by designing more than 15 major parts 'admitting of mutual substitution' in 6 different types of

PACIFIC
Precision Built
OIL WELL PLUNGER PUMPS



These Pacific Parts Will Assemble Six Different Types of Oil Well Plunger Pumps.

Pacific Moloy® sectional plungers are designed and finished so that when worn on the outside diameter they can be used as sectional liners without remachining.

Pacific plungers, ball valves, seats and cages, many bushings, adapters and fittings are interchangeable between types. Hold downs are interchangeable between types and between top and bottom.

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DW-7 DISTRIBUTED IN CANADA BY: Lucey Export (Canada) Ltd., 1215 9th Ave., Calgary

They Say—

Advice on Government Help

"Most of the industry's brushes with government simply result in more confusion. Take the so-called Detroit case, which is of prime importance to jobbers, although my company has been the immediate target. The Federal Trade Commission dragged us into the courts because we gave a lower price to jobbers than to dealers —get that!

"We think we won a great principle for business in general, and for jobbers in particular, when the Supreme Court reversed an earlier decision in the case. Although the FTC is still working on the question, we did establish the fact that good faith meeting of competition is an absolute defense.

"However, if we had refused to sell to the jobbers, then the Department of Justice might have sued us. Just to add to this crazy picture, while the FTC was complaining that we sold at too low a price, the state of Michigan protested that prices were too high!

"I would much rather see the government straighten itself out than to have its peculiar methods used on oil industry problems. These problems can be solved much better within the industry."

Dwight F. Benton, vice president, Standard Oil Co. (Ind.), addressing the Illinois Petroleum Marketers Association, Chicago.

Ominous Shadow

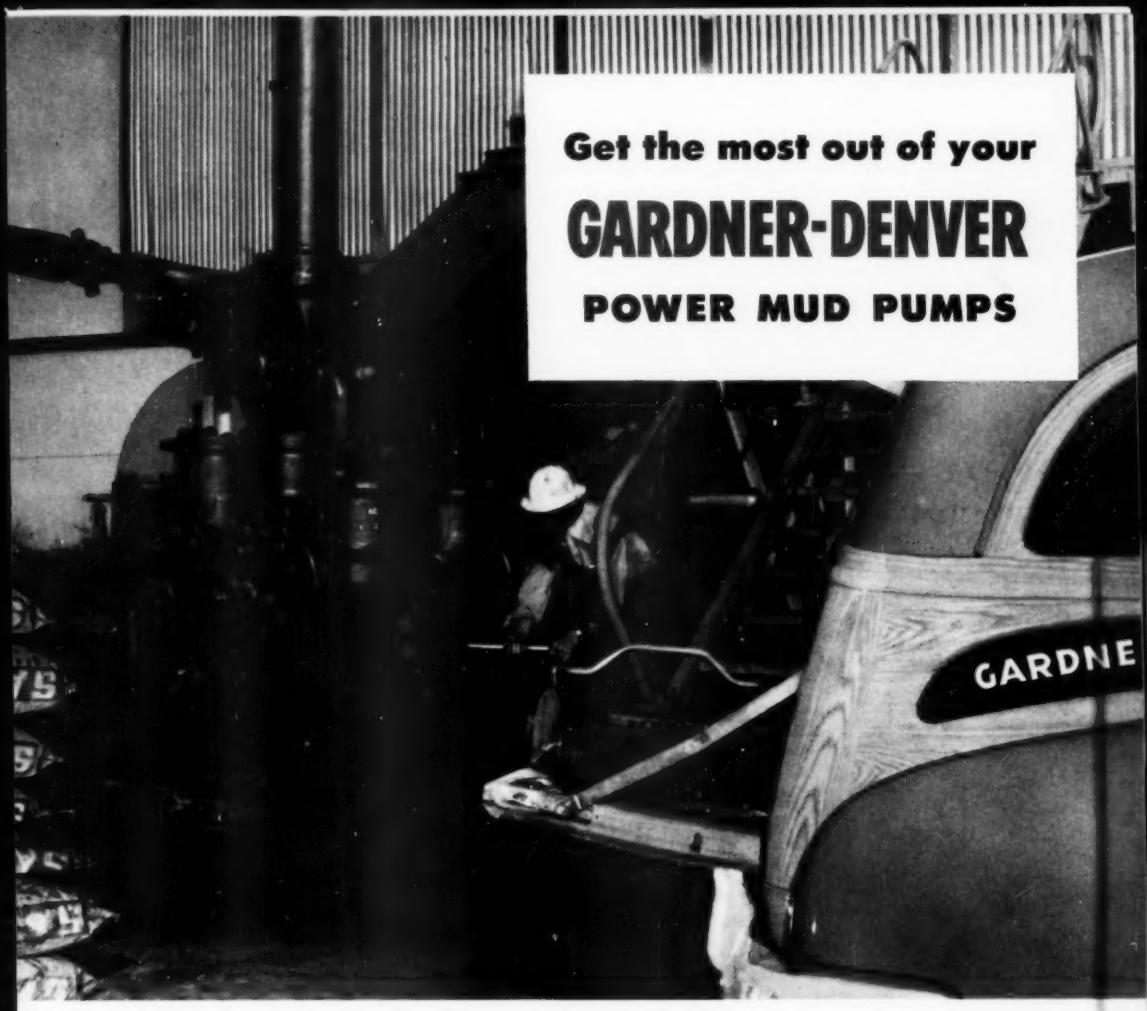
"Under the guise of stabilization, the Government is trying to manage the whole economy and directed the WSB to manage all the wage labor problems.

"In that situation, the WSB can hardly do anything else than clamp industrywide bargaining on the oil industry. It can't stop the unions' concerted action. It can't, short of doomsday, treat each case separately.

"So what do we move to? Toward exactly the situation we now have in steel. And when the oil industry is saddled with an industrywide labor pattern and a wage dispute threatens a nationwide strike shutting off all the oil the Government will feel it must seize the oil industry as it has the railroads and the steel industry.

"What is happening here in oil is also happening in the copper and brass industry. There, too, the industry by virtue of Government interference in collective bargaining is moving toward industry-wide, rather than a local, handling of labor disputes.

"Steel is only the shadow of what will come. So long as the Government,



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These Service Specialists are trained and equipped to make *all* repairs—even *the major ones*—on the drilling location.

Operating from 10 strategically located field offices, Gardner-Denver Specialists are always available to *properly* service your mud pump.

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You'll know greater economy in maintenance when there is a *Test Special* matched set on the V-drive. With each belt properly manufactured and the set matched . . . and correctly installed . . . maximum performance of the drive is assured.

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by attempting to manage every phase of the economy, has to interfere with the collective bargaining process, the unions will turn to the Government for what they cannot get in bargaining."

Editorial in the Wall Street Journal.

CALENDAR OF EVENTS

APRIL

30-May 2 American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y.

30-May 2 Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston.

MAY

1- 3 Southeastern Section Geological Society of America, and Southeastern Mineral Symposium, joint meeting, Hotel Roanoke, Roanoke, Va.

5- 6 National Air Pollution Symposium, Huntington Hotel, Pasadena, Calif.

5- 7 American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C.

8- 9 Texas Petroleum Research Committee, Fourth Oil Recovery conference, Austin, Tex.

8-10 Geological Society of America, Rocky Mountain section, University of Utah, Salt Lake City.

9-10 Interstate Oil Compact Commission, spring meeting, Phoenix, Ariz.

11-14 American Institute of Chemical Engineers, regional meeting, French Lick, Ind.

12-13 American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa.

12-13 American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles.

12-14 Annual Liquefied Petroleum Gas Association convention and trade show, Palmer House, Chicago.

12-15 American Petroleum Institute, division of refining, seventeenth midyear meeting, St. Francis Hotel, San Francisco.

13-15 Pennsylvania Gas Association, Wernesville, Pa.

15-16 American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles.

16 University of Kansas City, symposium on oil and gas, Kansas City.

17 Permian Basin Geophysical Society, first annual meeting, Scarborough Hotel, Midland, Tex.

19-20 American Petroleum Institute, Division of Marketing, midyear meeting, Sheraton-Plaza Hotel, Boston.

19-20 American Association of Oilwell Drilling Contractors, seventh annual safety clinic, Adolphus Hotel, Dallas.

21-23 Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo.

26-28 American Gas Association, production and chemical conference, Hotel New Yorker, New York.

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Get your FREE Tuffy 3-ft. sample sling and see for yourself how Tuffy's patented braided wire fabric makes an extra flexible sling. Tie it in knots, kink it, then see how easily it is straightened without damaging it in any way.

The reason is Tuffy's unique construction. (See enlarged photograph). Scores of wires are stranded into 9 parts, then machine woven into a wire fabric that has unusual flexibility and strength. Even cutting one of the 9 parts will not cause stranding.

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There's a Tuffy Sling for *your* needs. If not, Union Wire Rope engineers will help work out special slings. Each one is proof-tested to twice its safe working load and the safe working load is stamped on metal tag attached to each sling. If you have your own rigging loft, Tuffy fabric is available by the reel.

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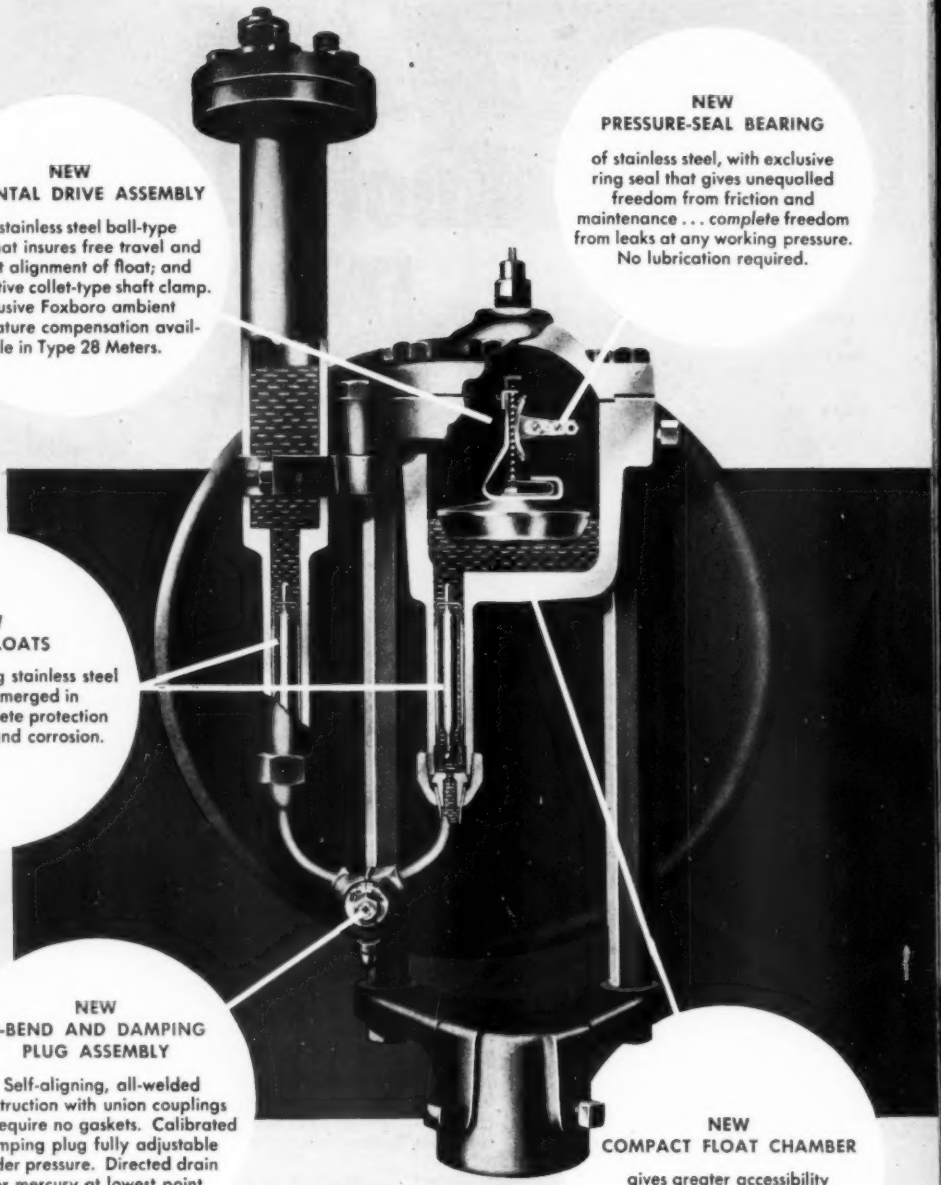

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with stainless steel ball-type chain that insures free travel and perfect alignment of float; and new positive collet-type shaft clamp. Exclusive Foxboro ambient temperature compensation available in Type 28 Meters.

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TYPE	MAX. W.P., PSI	RANGES
22	2000	20", 25", 50", 100"
26	5000	100", 200", 400"
27	2000	10", 20", 50", 80", 100", 200", 320", 400", 5"-0-5", 10"-0-10", 25"-0-25", 50"-0-50"
27U*	2000	100"
28	2000	50", 100", 200", 400"
29**	150	1", 2.5", 5", 10"

*Formed range chamber for uniform scale flow measurement

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With major improvements in every basic detail of differential meter design, the complete new line of Foxboro Flow Meters now gives, not only higher sustained accuracy, but also unprecedented ease of maintenance. It all adds up to metering performance that's **farther ahead of the field than ever before!**

In addition to the outstanding improvements illustrated, these new meters incorporate numerous other advanced features, including: interchangeability of all parts; large floats with long travel for added power; and location of floats in high pressure chamber to minimize ambient temperature effects.

Write for New Bulletin 460 containing detailed information on the design, construction and specifications of the new Foxboro Flow Meters . . . indicators, recorders, controllers and transmitters . . . round or rectangular cases . . . with or without integrators.

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Heavy duty goggles allowing plenty of room for prescription glasses to be worn safely and comfortably.

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Ideal for chemical workers. Rolled inner edge makes them fit snugly with utmost ease.

STYLE DL31

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See your WILLSON distributor or write for bulletin

WILLSON PRODUCTS, Inc., 204 Washington St., Reading, Pennsylvania

27-28	American Petroleum Institute lubrication committee, Mayo Hotel, Tulsa.
27-29	Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.
28-30	Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex.
29-30	Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston.

JUNE

1- 6	Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton hotels, Atlantic City, N. J.
2- 4	Seventh annual short course on process instrumentation, A. & M. College of Texas, College Station.
5- 6	Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.
5- 7	National Oil Scouts and Landmen's Association, annual convention, Hilton Hotel, Albuquerque, N. M.
7	California Natural Gasoline Association, annual June Frolic, Rio Hondo Country Club, Downey, Calif.
8-12	Canadian Gas Association, Chateau Frontenac, Quebec.
9-14	American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver.
12-13	Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita.
13-14	Rocky Mountain Oil and Gas Association, midyear meeting, Rainbow Hotel, Great Falls, Mont.
16-22	International Gas Conference, Brussels, Belgium.
19-20	Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky.
22-25	Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco.
23-24	Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich.
23-27	American Society for Testing Materials, annual meeting, Hotel Statler, New York.
23-27	American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis.

AUG.

1- 3	Wyoming Geological Association, field trip, Big Horn basin.
11-13	Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco.
19-22	American Institute of Electrical Engineers, Pacific general meeting Westward Ho Hotel, Phoenix, Ariz.
25-27	Twelfth Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPT.

3- 5	Pacific Coast Gas Association, Ambassador Hotel, Los Angeles.
8-12	Instrument Society of America, seventh national instrument conference and exhibit, Cleveland.
10-12	National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.
11-13	American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.
25-26	Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.

28-30 American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1-3 National Association of Corrosion Engineers, South Central section, technical program and committee meetings, Jung Hotel, New Orleans.

6 Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb.

9-10 California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.

13-15 Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.

13-17 American Institute of Electrical Engineers, fall meeting, New Orleans.

19 Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.

20-21 Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa.

22-24 Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa.

27-31 American Gas Association, annual convention Atlantic City, N. J.

30-Nov. 1 Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4 Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.

6- 7 Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.

6- 8 Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Texas.

8-13 Oil Industry Information Committee, Conrad Hilton Hotel, Chicago.

10-13 American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

13-14 Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.

30-Dec. 5 American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

7 Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.

7-10 American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

Otis "Storm Chokes" protect your production 24 hours a day — *fully automatic*, thoroughly dependable *sub-surface* shut-off of wild, uncontrolled flow of high-pressure wells. Otis Tubing Safety Valves allow the flow to follow a single, straight course under normal production pressures. The instant surface connections fail and the upward thrust of the pressure differential across the valve exceeds the valve spring compression, the tool automatically snaps to a positive shut-off. After surface connections have been repaired, the safety valve can be reopened by equalizing the pressure across it. An Otis Tubing Safety Valve Cage Assembly can be made up and landed with Types S, J, or B Otis Locking Mandrels and run or pulled, under pressure, on a wire line with standard Otis running and pulling tools. If you have high-pressure flowing wells in areas subjected to seasonal storms, or near schools, highways, or in other vital locations, you need the positive protection of an Otis Safety Valve. For full particulars and an illustrated bulletin on the entire line of Otis Safety Valves (tubing and surface), write us at Box 7206 in Dallas, or contact the Otis office in **Houston, Corpus Christi, Longview, Victoria, Falfurrias, Odessa, New Iberia, Shreveport, Houma, Oklahoma City, or Elk City.**

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right to 35
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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Less Work, More Pay

THE way things are going in the steel and oil industries, you may wake up some morning and find that the Government is running your company and that the Secretary of Commerce and the Wage Stabilization Board are dictating pay scales.

Against that possibility we started boning up on the WSB rules and regulations for getting a pay raise. What we discovered left us goggle eyed, giddy headed, and walking around in a pink cloud.

As we interpret the regulations—and we read them over several times without finding a joker—anybody who can be classed as an executive, administrative, or professional employe has a far better chance of getting a raise than a mere worker. And what is the distinction? Listen closely. An executive, administrative, or professional employe is one who spends less than 20 per cent of his time working.

That's what it says, so help us. If you work more than 20 per cent of your time you can't be an executive. A worker, on the other hand, is a poor sap who works at least 20 per cent of the time.

Now we're not going to undertake to tell you how to run your business (the Government will do that) but we'll let you in on our own personal program. We're going to make darn sure that nobody catches us working more than 20 per cent of the time; no siree, not this chick. We want to get classified right in the middle of that E, A, & P group.

The magnanimous government regulations will then permit us to spend the other 80 per cent of our time on such things as advising top management on company policy (nice work if you can get it), giving orders to subordinates (we're going to like that part), and utilizing specialized intellectual learning, creative talent, and inventive imagination (brother, that describes us to a T).

Ah, life is going to be wonderful when the Government takes over—if we can just restrain a lifetime of habit by managing to keep from working more than 20 per cent of the time. That's going to be hard, but we're willing to make the effort as a patriotic endeavor to assist the Government in its stabilization program.

In fact, if this keeps up we're liable to turn into a New Dealer. Private capitalism never dangled any such roseate promises before our starry eyes.

Atomic (Publicity) Power

ATOMIC energy, to our way of thinking, is getting far too much publicity in the popular press. Now we don't doubt the potency of the A-bomb nor do we question the prediction that atomic fission may some day become an important source of energy. We just want to issue a warning that the day of atomic power is not here yet despite some optimistically misleading headlines we have seen lately.

For example, we recently saw a news story to the effect that tetraethyl fluid can now be made radioactive, and the inference left with the hasty lay reader was that science has now evolved an atomic fuel which will drive automobiles even faster than the advertisements say the new cars will go on just plain gasoline. But close reading disclosed that just a pinch of a radioactive isotope is added to the fluid as a tracer to permit researchers to study how gasoline burns in an engine. Mighty fine, but quite a step short of an atomic-powered car.

Another instance was a yarn about atomic energy getting a stuck "pig" (cleaning plug) out of an oil pipe line. Actually, a second pig, containing a radioactive tracer, was sent in after the first and men on the surface were going to follow its course with Geiger counters. But the compressed air used to move the tracer pig was strong enough to dislodge the stuck one, so atomic energy really had nothing to do with it. Radioactive tracers deserve publicity in their own right, but they shouldn't get credit for things they can't do.

Relax, refiners; atomic energy isn't going to displace petroleum products as an important energy source; not right away at least.

—*Henry D. Ralph.*

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THE OIL AND GAS
JOURNAL
Vol. 50, No. 51

NEXT WEEK

• **The Annual Field Processing Number.** This issue will feature many of the papers presented at the annual meeting of the Natural Gasoline Association of America, at Houston. It also will present the results of the Journal's annual survey of natural-gasoline plants and cycling plants, with analyses of the findings. The survey includes a listing of new construction projects under way, planned, and authorized. In addition, there will be articles specially prepared by members of the Journal staff, and contributions from authors in the industry.

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BAKER RETAINER BRIDGE PLUG

The plot thickens in the synthetics controversy

THERE'S a mighty fishy smell about the latest turn in the long controversy over synthetic liquid fuels. It's the same smell that has been quite noticeable all along. To us it smells like a sly plot to put the federal Government into the business.

To review a bit: The Bureau of Mines, under a special congressional appropriation, has conducted extensive research tending to prove that various intricate processes can turn coal into gasoline and a wide variety of organic chemicals. Industry's reaction was that this is helpful and reassuring knowledge which may have commercial application some time in the future. But some people in Government insist that plants should be built at once.

SO last fall the bureau ventured into economics and issued a report which said that private industry could build plants which would make a profit selling gasoline at current market prices. The National Petroleum Council then said that the estimates were full of holes and that gasoline would have to sell at four times current prices to pay out. So the bureau hired Ebasco Services, Inc., a consulting firm, to arbitrate.

Now Ebasco has reported that the truth probably lies somewhere between the two extremes. But it develops that Ebasco was not allowed to review the entire controversy but was limited to checking certain selected segments of the bureau's estimates. Reading the Ebasco report leaves the strong impression that its authors would not want to invest a nickel in any such venture, even though the guarded language appears to support many of the bureau's claims.

The Ebasco report makes it clear that gasoline would be a byproduct of a coal-liquefaction plant since more than half the profits would have to come from chemicals. It also points out that the present market for these chemicals would not support a very extensive synthetics program. So the Ebasco report settles nothing.

HERE'S what smells so fishy about the whole thing: This country is full of oil and chemical companies which have just as much technical know-how as the Bureau of Mines and a lot more economic savvy. If they could see a fair chance to make a synthetic plant pay out they wouldn't need any prodding to get into the business—and they wouldn't depend on the bureau's estimates of costs and profits.

The spectacle of a government agency plugging a set of hypothetical figures to prove that industry could make a profit where industry says it will lose its shirt looks to us like just one thing—an attempt to convince the public that private industry is defaulting on synthetic fuels and that therefore the Government is fully justified in entering this risky business with the taxpayers' money.

THIS WEEK

INSIDE A SALT DOME stands G. H. Billue, of Security Underground Storage, Inc., whose job it is to find places like this suitable for storing petroleum products. This unusual view of the heart of salt dome was taken in a Morton Salt Co. mine at Grand Saline, Tex., east of Dallas. Dark stripes are anhydrite stringers.

DEVELOPMENT.—Spraberry area now completing wells at rate of 6 per day, more than any entire state except Texas and Oklahoma. . . . Area has fourteenth of all U. S. rigs running, increasing productivity steadily. . . . ¶Development of Williston basin to take time, Texaco chairman says, since area is remote, wells are costly, and local demand is limited. . . . Wildcats cost $250,000 up, he says, with development wells costing $150,000 to $250,000 each. . . . ¶New records in the finding of reserves seen for western Canada on basis of first-quarter operations. . . . Operators brought in 30 successful wildcats during first quarter, including 13 commercial oilers. . . .

INTERNATIONAL.—New lube plant at huge Abadan refinery placed in operation by Iranian technicians, eliminating need for imports of lubricants. . . . Development means little to Iranian economy, since nearly all other process equipment still is idle. . . . Lubes were only product not stored in quantity in refinery tank farm. . . . ¶W. S. S. Rodgers tells stockholders Saudi Arabia is discontented with concession contract. . . . King believed dickering for more income from nation's oil operations. ¶Entry of private capital into Peruvian oil industry considered more remote following recent revolution. . . . Both companies and present government apparently reluctant to propose entry of outside interests. . . .

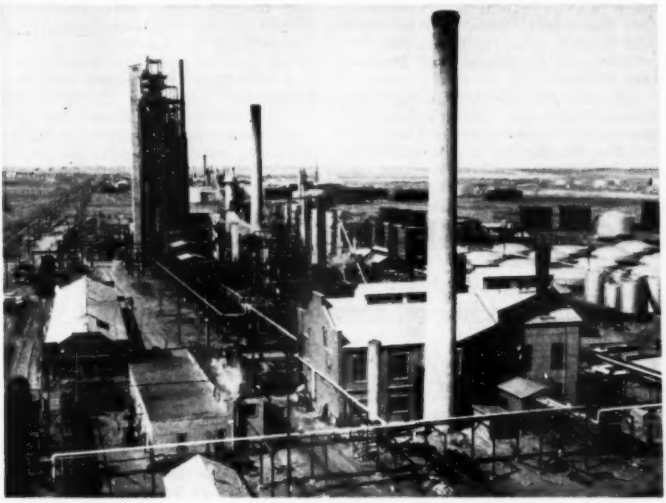
ACTIVITY.—Production of crude and lease condensate averaged 6,364,525 bbl. daily for week ended April 19, up only 50 bbl. daily from previous week. . . . ¶Total completions for the week increased 108 wells to 930. . . . Wildcat completions totaled 187 compared with 167 for previous week and 169 for same week in 1951. . . . ¶Rotary rigs operating in United States on April 21 amounted to 2,774, down 18 rigs for the week but up 401 from corresponding date last year.

TRENDS.—Total refinery runs averaged 6,458,000 bbl. daily for the 3-week period ended April 19, an increase of 297,000 bbl. daily over same period in 1951. . . . ¶Major-product stocks increased 40,000 bbl. daily this year but decreased 205,000 bbl. daily last year. . . . ¶Calculated refinery demand for major products was up only about 2.6 per cent over same weeks in 1951. . . .

PRICES.—There's no prospect for lifting the ceiling on crude or any major changes in product prices, Ellis Arnall tells Senate committee. . . Controls will stay on all basic goods in demand by both Government and public, and that includes fuels, price stabilizer says. . . . ¶OPS attorney echoes view before N.P.A. meeting, saying shortages don't justify a price hike, that increases, when given, will be based on question of whether prices are fair and equitable without regard to supply-demand situation. . . . ¶Imperial knocks 14½ cents per barrel off purchase price for Alberta crude. . . . Company says move meets lower competitive cost of imports resulting from improvement of Canada's dollar-exchange position. . . .

REFINING.—PAD executive tells NPC refinery runs this year will average 6,714,000 bbl. daily, forecasts first-quarter runs next year at rate of 6,906,000 bbl. daily. . . . NPC told U. S. refineries will have to operate at near-capacity levels to keep up with growing demand and European plants must operate at abnormally high rates if Abadan refinery remains idle. . . . ¶Octane ratings over nation on April 1 were unchanged from end of 1951, Du Pont survey shows. . . . Improvement in ratings expected this summer now that TEL restrictions are off. . . . ¶Distillate demand during next heating season will be 10 per cent greater than the one just past, Gulf executive predicts. . . .

STEEL.—Pipe-line construction to be stepped up in third quarter, helped along by a PAD allocation of 407,212 tons of steel for gas lines, 442,667 tons for oil lines. . . . Refineries also to benefit from larger allocation of carbon steel. . . . Marketers to get biggest break with a jump from 3,849 tons in second quarter to 18,597 tons. . . .



NEW ECONOMIC OUTLET for this 8,500-bbl. refinery of Socony-Vacuum will be provided by the newly proposed Casper-Rawlins pipe line.

Markets Shifting

Rocky Mountain refiners looking more and more to the west as line outlets increase, other refiners encroach

This is the first of a series of articles prepared by George Weber on new developments in the Rocky Mountain and West Coast areas. Weber, who is the Journal's refining editor, is now on a 6-week tour of operations in those areas. The May 5 issue of the Journal will include a description of new developments in operations of the Cheyenne refinery of Frontier Refining Co.

SALT LAKE CITY.—The recent announcement of plans for a 100-mile products pipe line from Casper to Rawlins, Wyo., emphasizes an already pronounced shift in Rocky Mountain marketing areas and refining capacity to the west and northwest.

This trend, under way for several years, has been brought about principally by the growth of product pipeline systems both within and without the mountain region. It has been helped along by the development of new production in the western Rockies and the Williston basin.

Generally speaking, the Rocky Mountain region promises refiners a general increase in local consumption in the future, requiring a moderate program of plant expansion and modernization. A fairly bright demand outlook is supported by a fast-growing summer-tourist business superimposed on a general increase in gasoline consumption.

An outstanding exception to this regional-market prospect lies in the opening of new markets in the Intermountain area centering in Utah and the growing movement of products through it to the Pacific Northwest.

Until now, this expanding outlet has been a major benefit only to Salt Lake refiners. Discovery of production in the Rangely area and the building of Salt Lake Pipe Line Co.'s product line to Pasco, Wash., pushed Salt Lake City into a leading position as a Rocky Mountain refining center.

Now the building of two additional products lines will extend the advantage to other refiners in Wyoming.

New lines.—Pioneer Pipe Line Co. will this summer build a 310-mile, 8-in. line from the Sinclair Refining Co. plant at Sinclair, Wyo., to North Salt Lake. This $8,000,000 line will carry 12,000 bbl. per day and will link Sinclair with the Utah market and, via the Salt Lake Pipe Line, to Idaho and points north and west.

The line will be owned 65 per cent by Continental Oil Co. and 35 per cent by Sinclair. It will permit the use of excess capacity at the Sinclair refinery for the benefit of both companies in the Intermountain marketing area.

Robert L. Minckler, president of General Petroleum Corp., in mid-April announced plans for the 100-mile Casper-to-Rawlins line. This line will tie into the Pioneer line to Salt Lake City and will give the Socony-Vacuum refinery at Casper an added outlet to the region. This refinery, too, is presently operating at less than capacity.

The line will permit refining capacity in the Rocky Mountain region to supply markets in Utah and possibly to the north, at the expense of capacity to the west.

Trend factors.—While no plans have been announced by other refiners for seeking new western and northwestern outlets it appears probable that this trend will continue.

The contributing factors have been in evidence for several years. Except for the Salt Lake area, the Rocky Mountain region has an excess of refining capacity. This arises primarily from the extension of Mid-Continent refiners' markets along the eastern fringe of the mountain belt. Through product pipe lines, refiners to the east and southeast have gradually encroached on markets in the western plains and have successfully competed with Rocky Mountain operators who formerly supplied much of that area.

The westward squeeze will be accelerated by the building of refineries in the Williston basin and by plants near the terminus of the Interprovincial Pipe Line at Superior, Wis., which may in the future process increased volumes of Canadian crude.

Standard Oil Co. (Ind.) has announced firm plans for constructing a Williston basin refinery, and Producers Refining, Inc., of West Branch, Mich., has also revealed an interest in building a refinery in North Dakota. The shipping advantages of these refiners will tend to convert additional areas to the northeast to "shipping loss" markets for Rocky Mountain refiners.

There has been some consideration of a products pipe line eastward from the Rocky Mountain area, but there is yet no indication that this will come about. The Platte Pipe Line, withdrawing additional crude from the area for processing in the large refineries of the Middle West, underscores the economic fact that the Rocky Mountain region is not a feasible location for refining and eastward product shipping.

A stabilizing influence for southern Wyoming refiners has been the Wyco Pipe Line, which serves the Cheyenne and Denver area out of Casper. This has retained much of the Colorado market for regional processors, al-

though some of that state is served by pipe line from the southeast.

Refinery expansion.—For the foreseeable future, it appears that most of the increase in crude runs to stills and a large share of new refinery construction will be shared by refiners with economic outlets to Utah, Idaho, Oregon, and Washington.

Phillips Petroleum Co. is installing an 8,000-bbl.-per-day T.C.C. unit and will increase crude capacity from 4,200 bbl. per day to about 11,000 bbl. per day.

Both Salt Lake Refining Co. and Utah Oil Refining Co. are operating their Salt Lake plants at capacity or above. Salt Lake Refining recently placed a vacuum flash unit in operation to increase its yield of cat cracker feed. Utoco has installed new steam boiler capacity and is adding a new naphtha stabilizer.

Carter Oil Co. has revealed plans for building a new Salt Lake City refinery to process new production which the company is developing in the Uinta basin. Capacity of the new refinery has not been announced, and its construction is contingent on the ability to move the waxy high-pour-point crude economically across the Wasatch Mountains to the Salt Lake area.

Pipe-line situation.—At present Salt Lake Refining Co. is moving products through the Salt Lake Pipe Line to the navigable Columbia River at Pasco, and to several intervening points in Utah, Idaho and Oregon. Utah Oil Refining Co. is also shipping products through the line as far as Boise.

Upon completion of its expansion program, Phillips will be using the line to Boise, as will Sinclair and Continental when their joint pipe line from Wyoming is completed. Socony-Vacuum and others to the east may be moving products through the line at a later date. As a result, the Salt Lake line is to be looped to Boise and additional booster stations may be added if necessary in the future.

The new outlet to the Pacific Northwest may in the future be limited by the entry of Alberta crude to Vancouver. The Trans Mountain Pipe Line will pass within 125 miles of the international border in eastern Washington, and refiners are discussing the possibilities of obtaining crude for processing in what is known as the Inland Empire of eastern Washington and Oregon and northern Idaho. The only refinery in that region, operated by Phillips Petroleum Co. at Spokane, is supplied with Wyoming and Montana crudes by tank car, and a take-off from the Canadian line to the north would promote expansion of refining capacity in that region.

It is now apparent that the new supply of Alberta crude to the Pacific Northwest will at some point limit the present expansion of Rocky Mountain refiners' markets in that direction. The trend to date has been promoted by the vacuum arising from the limited crudes available to California refiners. Were it not for the Trans Mountain line refiners with access to the Salt Lake products line might have moved products economically into the coastal areas of Washington and Oregon, since the Columbia River is navigable by barge from Pasco to the Pacific.

Alkylate produced in Salt Lake City is now being pipe lined to Pasco and moved by barge to tanker terminals on the Pacific for transshipment to the San Francisco Bay area.

However, the Inland Empire east of the Cascade Range remains a prime market for Rocky Mountain refiners with its rapid industrialization, and the Intermountain area promises a steady growth of consumption, though competition for markets in both regions will be stiff. The decentralization of industry is bringing new manufacturing plants to Colorado and other mountain states, and this general trend plus a bright tourist prospect may more than make up for lost markets to the east.

Revival in the Rockies

Oil production there will have big spurt if operators use modern science, Endacott tells regional A.P.I. group

CASPER, Wyo.—The Rockies are on the threshold of a great oil revival provided oil operators of the region put to use the recent advances in technology, is the view of Paul Endacott, president of Phillips Petroleum Co., Bartlesville, Okla.

As the keynote speaker at the spring meeting of the Rocky Mountain district of the American Petroleum Institute division of production opening here April 24, Endacott posed the question "Are Oil Producers Giving Science a Break?"

He cited the modern technical advantages which stand ready to help the producer of oil in this and other areas as a contrast to the old days when "operators of the old school relied primarily on hit-and-miss methods, hunches, and rules-of-thumb."

The present has great advantages over the former Rocky Mountain boom, he said, because of the technical knowledge now available. "In addition," Endacott added, "there is a new confidence in the oil potentialities of the Rocky Mountain area."

Endacott told of the difficulties of bringing scientific skills to exploration for oil, reciting personal experiences along this line. He said that this branch has adopted many advanced scientific techniques, some independently developed, some borrowed from other industries. Present progress in utilizing scientific developments in producing oil and gas after the well is on production was emphasized. The speaker mentioned growth of unit operation, wise conservation laws, and industry self-regulation as aids to employment of technical advance in this respect.

The outstanding contribution of the American Petroleum Institute has been in the field of standardization of equipment, which is, he said, "basically the foundation on which the production industry has been built."

Research programs being sponsored by A.P.I., including a search for a better means of drilling that the rotary and cable-tool methods in use, fundamental research in sucker-rod pumping, and effect of oil-field wastes on marine life were mentioned by the keynote speaker as a sort of forecast of what may be expected of science by the oil man.

Endacott challenged Rocky Mountain operators to employ science to the fullest to solve the regional problems of complex geology, difficult terrain, inaccessability, and formation character. "Accept the challenge of these difficulties and build the Rocky Mountain area to prominence through the application of technology and research," he urged.

Williston Facts

Basin's drawbacks outlined before Texas Co. directors

NEW YORK.—Some hard facts which most operating oil men already know about the Williston basin exploratory program, were laid before stockholders of The Texas Co. last week by W. S. S. Rodgers, chairman of the board.

Rodgers shared the optimism over the basin's eventual prospects but warned that it will be several years before the production comes on the market in any significant quantity.

His remarks had an immediate reaction in the stock market. Some of the investment enthusiasm over Williston cooled off at least momentarily, and the stock of several companies with interests in the basin declined sharply.

Northern Pacific Railroad, a market favorite because of its Williston land holdings, broke nearly 6 points, and Amerada Petroleum Corp. dropped almost 4 points.

"We estimate," Rodgers said, "that the wildcat wells in Williston will cost from $250,000 up and that the development wells will cost between $150.00 and $250,000 each."

The Texaco head pointed out that the area is remote and that the local

demand for crude oil is relatively small. For some time to come, he said, the major portion of the crude produced will be shipped by tank car into some of the large refining centers such as Chicago. "It is our opinion that until enough crude-oil reserves are developed to warrant pipe-line facilities into the large refining centers, operations will not be on a very extensive basis," he said.

Rodgers forecast high exploratory activity in the basin this year and said there will be in all probability some important discoveries. The Texas Co. holds approximately 1,700,000 acres in the basin.

In eastern Montana the company has already discovered one oil field and has an interest in another field discovery. He said a substantial part of the company's acreage in this area had been taken as a result of geological and seismic work and appears to be well located.

Demand forecast.—Rodgers said total domestic petroleum demand for 1952 will exceed 1951 demand by about 5 per cent, which was the increase for the first quarter of this year. Expansion of facilities by The Texas Co. will require the expenditure of about $250,000,000 and a like amount probably will be spent in 1953 depending on availability of materials and economic conditions.

CANADA

Big Year for the West

One discovery every 3 days is first-quarter record of western Canada; Alberta already has produced 23 strikes

CALGARY.—This will be a big year for western Canada, if first-quarter activity can be taken as an indication of what is to come.

During the first 3 months there were 30 wildcat discoveries of either oil or gas, or a new well every 3 days. In addition, eight wildcats either found encouraging shows or proved new extensions to old fields.

The successful-completion record in Alberta, for example, showed a 72 per cent increase over the first quarter of 1951.

The 30 new discoveries include 13 oil strikes and 17 gas wells.

Alberta.—Most of the new finds so far this year have been in Alberta. This province has posted 11 new oil strikes and 12 gas discoveries, with most of the drilling activity in the central sector.

Gas reserves of the province were increased considerably during the first 3 months, with some recording flow potentials of as much as 12,000 M.c.f. on drill-stem tests. Nearly all wells were capped upon completion due to lack of outlets.

The Peace River sector of Northwest Alberta is experiencing an increased exploratory and development program as a result of the provincial government's approval of plans to export natural gas from the region.

Of Alberta's 11 oil discoveries, 8 were in the Devonian. They are: Bashaw, a D3 discovery or extension; Bonnie Glen, gas and oil; Leduc-Woodbend, a new D3 pool in South Leduc; Malmo, D2 and D3; Nevis, gas condensate and oil; New Norway, a D2 stepout discovery; South Stettler, D3; and Twining-Three Hills, which found oil in both Madison and Devonian. An extension venture at Duhamel indicated oil in the Lower Cretaceous and also in both the D2 and D3 zones of the Devonian.

Gas discoveries were made in these areas: Bashaw-Red Deer Lake; Beaverhill Lake, Bonnyville, Bullpound, Carbon, Chigwell, Chinook, Clive, Dunvegan, and Millet.

Saskatchewan.—Four discoveries have been made in this province so far this year.

Outstanding strike was that made in the Driver area of West Central Saskatchewan which proved to be the province's first light-oil discovery. The light crude was found in the Viking sand, but the well also indicated heavy crude oil production in the Banff sand.

A medium-gravity oil discovery was made in the Fosterton area of southern Saskatchewan. The two gas strikes in the province were made in the Viking sand in the Coleville-Driver and Elrose areas.

British Columbia and N.W. Territories.—Three natural-gas discoveries were made in British Columbia in the northeast and southeast sectors of the province during the first quarter.

The Gething, Cadomin and Triassic formation paid at one of the wells, while Cadomin and Triassic yielded at the other two. Three other wells are currently drilling in the Fort St. John area, one testing the Triassic.

Several wildcats are planned for the Northwest Territories region this summer, following encouraging shows in porosity and saturation at extremely shallow depths at two recent structure test wells in the province.

Ioco Contract Let

SARNIA, Ont.—The contract for the major portion of a $13,500,000 construction program at the Ioco, B. C., refinery of Imperial Oil, Ltd., has been awarded to Canadian Bechtel, Ltd., of Vancouver.

In announcing the award, R. W. Dunlop, manager of the engineering division of Imperial's manufacturing department, said ground preparation and preliminary engineering work will start immediately. Erection of the new equipment will start early in the fall and it is expected the work will be completed by the fall of 1953.

The expansion will raise the refinery capacity from its present 12,000 bbl. daily to 22,500 bbl. daily. The enlarged refinery will process crude oil brought from Alberta by the Trans Mountain pipe line.

A 7,600-bbl.-daily fluid catalytic cracking unit is part of the program. Other equipment includes atmospheric and vacuum distillation units, gas recovery unit, and treating facilities.

Imperial Cuts Crude Price

CALGARY.—Reduced purchase prices for Alberta crude oil were posted April 23 by Imperial Oil, Ltd., to meet the lower competitive cost of imported crude oil at Sarnia resulting from the improvement in Canada's dollar-exchange position.

The price reductions were 14½ cents per barrel and the new prices in the larger fields are now: Redwater, $2.315; Leduc, Woodbend, $2.475; Golden Spike, Acheson, Stony Plain and Armisie, $2.39; Excelsior and Joseph Lake, $2.255; Turner Valley, 41°-gravity, $2.955.

Imperial also announced reductions in the wholesale prices of gasoline and light fuel oils due to the improvement in Canada's exchange position and regional variations in other costs. The amounts of the reduction at central distribution points across Canada range downward from 1 cent for gasoline and 0.4 cents for fuel oils.

Gas Found in Nova Scotia

HALIFAX.—First discovery of natural gas in Nova Scotia has been reported by the province's Industry Department.

The gas was found during drilling operations seeking salt and limestone deposits on the south side of Antigonish Harbor. Dr. Don J. O'Neil, professor of geology at St. Francis Xavier University was in charge of operations and said the gas was discovered at a depth of about 400 ft.

There was no gage of the flow, and O'Neil said it was questionable whether the find would be commercial.

More Steel Coming

Oil and gas projects get more steel for third quarter and PAD thinks supplies will be still easier later on

Bertram F. Linz

WASHINGTON. — With steel production back at preseizure levels, expansion of oil and gas facilities is expected to speed up steadily from now on.

Officials of the Petroleum Administration for Defense appear confident that the upsurge in steel supplies which permitted an increase in third-quarter allocations marks a permanent trend rather than just a temporary easing of the situation.

Third-quarter allocations of steel for the oil and gas industry are higher than those of the current quarter in practically every category, but it probably will be some time before PAD can drop its present policy of distributing steel on the basis of approved programs.

For example, in the case of oil-country tubular goods the third-quarter allocation is substantially larger than the current one but the supply will not go as much further in proportion as the figures would indicate. This is because PAD has been denying new supplies to Class B operators with excessive inventories and so has been able to spread tubular goods more broadly. Much of the excess inventory has been worked off in this way and operators consequently are on a current basis.

Tubular goods. — The allocation for tubular goods for the third quarter is 424,000 tons of carbon steel and 63,575 tons of alloy steel, compared with 412,000 tons of carbon and 38,000 tons of alloy in the second quarter.

In allocating its steel, PAD has distributed supplies to producers on the basis of their drilling programs and past history, with special provision to permit the smallest operators to continue drilling. Refinery, pipe line, and other projects are approved in the order of their importance in the expansion program and are then given allocations sufficient to keep construction moving.

Line pipe.—Beginning with the third quarter, pipe-line construction will be stepped up, particularly for natural gas. PAD has an allotment of 407,212 tons of carbon steel for gas transmission and distribution for the July-September period, compared with 335,306 tons for the current quarter.

Construction of facilities for oil transportation will not be correspondingly expanded since, while PAD has 442,667 tons of steel for this purpose compared with 423,105 tons currently, some of the larger third-quarter allotment is to be used for military storage.

Refineries.—The third-quarter allocations also make better provision for the construction of refining facilities approved by PAD under the expansion program. Although the allotment of stainless steel will be reduced to 7,250 tons from 7,415 tons this quarter, the set-aside of carbon steel will be increased to 173,705 tons from 149,575 tons. In addition, the allotment of copper and copper-base alloys is increased from 3,852,000 to 4,109,000 lb. and aluminum from 209,000 to 412,500 lb.

The biggest increase, percentagewise, will come in steel for marketing for which 18,597 tons will be provided against 3,849 tons this quarter.

Equipment.—To keep pace with expanded construction activity, a total of 205,000 tons of carbon and alloy steel will be provided for oil-field machinery and equipment, against

Major Oil Pipe Lines Scheduled to Be Completed in 1952

Owner and location—	Mileage	Size of pipe (in.)	Capacity, bbl./day	Estimated cost
Platte Pipe Line Co., Wyoming to Wood River, Ill.	1,080	16, 20	70,000	$59,000,000
Service Pipe Line Co., Drumright, Okla., to Sugar Creek, Mo.	50	12, 16, 20	38,600	3,993,140
West Texas Gulf Pipe Line Co., West Texas to Gulf Coast and Longview, Tex.	577	20, 26	301,000	39,672,032
Sinclair Pipe Line Co., Drumright, Okla., to Chicago	683	22, 24	280,000	51,942,000
Ohio Oil Co., Sheridan, Ind., to Lima, Ohio	117	22	180,000	19,727,185
Shell Pipe Line Co., Gohlke to La Grange, Tex.	64	8	15,000	3,211,450
Service Pipe Line Co., Freeman to La Platte, Mo.	30	20	17,000	2,842,900
Continental Pipe Line Co., Rincon to Port Isabelle, Tex.	105	8	17,000	1,935,000
Texas Pipe Line Co., Louisiana to Port Arthur, Tex.	319	10, 12, 22	167,000	18,717,430
Shell Pipe Line Co. (Rancho), McCamey, Tex., to Houston	463	24	209,000	41,593,000
Texas Pipe Line Co., Corsicana to Houston	175	16	60,000	7,878,600
Cities Service Pipe Line Co., Sour Lake, Tex., to Lake Charles, La.	64	18	150,000	3,100,000
Continental Pipe Line Co., Wichita Falls, Tex., to Ponca City, Okla.	127	12	40,000	4,200,000
Interstate Oil Pipe Line Co., La. points to Baton Rouge	102	4, 16	22,000	6,480,000
Gulf Refining Co. (Mesa), Midland to Colorado City, Tex.	80	24	260,000	5,658,575
Interstate Oil Pipe Line Co., Southwest Louisiana	126	4, 16	35,000	5,610,000
Texas-Empire Pipe Line Co., Wilmington to Lockport, Ill.	29	18	69,000	1,546,148
Interstate Oil Pipe Line Co., Bunkie to Melville, La.	33	20	107,000	1,445,000
Service Pipe Line Co., Bowie, Tex., to Drumright, Okla.	33	16	28,000	1,980,000
Pasotex Pipe Line Co., Wink to El Paso, Tex.	200	8	40,000	3,283,390
Interstate Oil Pipe, Flora to Bunkie, La.	63	12, 16	107,000	2,935,000
Toronto Pipe Line Co. (Sterling), Sterling, Colo., to Curley, Neb.	115	12	60,000	2,200,891
Humble Pipe Line Co., Hawkins to Baytown, Tex.	201	12, 18	66,000	8,141,000
Ohio Oil Co., Lima to East Sparta and Newark, Ohio	214	10, 12	25,000	3,936,000
Tuscarora Oil Co., Allentown to Midland, Pa.	74	6, 10, 12	45,000	8,398,000
Phillips Petroleum Co., Borger, Tex., to Chicago	933	8, 10, 12	32,700	20,883,450
Standard Oil Co. (Ind.), Neodesha to Sugar Creek, Mo.	125	8	12,000	3,707,100
Shell Oil Co., Wood River to Chicago and Detroit	554	8, 14	85,000	15,850,000
Phillips Oil Co., Sweeney to Freeport, Tex.	27	12	115,000	1,502,000
Ohio Oil Co., East St. Louis, Ill., to Indianapolis	255	8, 10	14,000	2,893,000
Buckeye Pipe Line Co., Linden, N. J., to Allentown, Pa.	75	16	80,000	6,792,000
Bell Oil & Gas Co., Ardmore to Drumright, Okla.	145	6, 8	9,000	3,271,396
Standard Oil Co. (Ind.), Sugar Creek, Mo., to Dubuque, Iowa	316	12	40,000	10,430,000
Susquehanna Pipe Line Co., Fostoria to Randolph, Ohio	125	6, 8	19,200	3,095,000
Phillips Petroleum Co., Odessa to Borger, Tex.	104	8	8,650	2,728,800
Phillips Pipe Line Co., Okmulgee to Tulsa, Okla.	35	6	12,000	566,400
Sinclair Pipe Line Co., Sinclair, Wyo., to Salt Lake City	310	6, 8	12,000	7,839,849
Salt Lake Pipe Co., Salt Lake City to Boise, Idaho	329	8	17,000	8,000,000
Standard Oil Co. (Ohio), Toledo, Ohio	15	6	9,500	987,000
Vickers Petroleum Co., Potwin to El Dorado, Kans.	13	8	16,500	400,000

179,084 tons this quarter. The allocation of copper and copper-base alloys will be increased from 2,150,000 to 2,705,000 lb. and the supply of aluminum will be increased 5,000 lb. to 725,000.

Gas lines.—A total of 169,600 tons of line pipe have been allocated by PAD for third-quarter construction of six major natural-gas pipe lines, all but one of which are scheduled for completion by the end of this year. At the same time, PAD announced it had allocated 214,800 tons of pipe to several hundred smaller projects, including gathering and distribution lines, other facilities, and maintenance, repair, and operations.

Details of the six major lines for which allocations have been provided are as follows:

El Paso Natural Gas Co.: Looping of the existing Texas-California system to provide additional gas for California, estimated cost $60,828,000, daily capacity 200,000 M.c.f., completion date fourth quarter, given 46,200 tons.

Interstate Natural Gas Co.: Expansion of system to provide additional gas for Baton Rouge, La., industrial plants; estimated cost $3,869,000, daily capacity 110,000 M.c.f., completion date fourth quarter, given 10,400 tons.

Houston Pipe Line Co.: Additional facilities into the Houston-Texas City area; estimated cost $2,400,000, daily capacity 60,000 M.c.f., completion date fourth quarter, given 8,400 tons.

Texas Gas Transmission Corp.: Extension and looping of the Texas-Ohio system to provide additional supply to present customers; estimated cost $46,126,000, daily capacity, 260,000 M.c.f., completion date third quarter, given 32,600 tons.

Southern Natural Gas Co.: Looping and extension of system for additional supplies to its entire market area; estimated cost $77,675,000, daily capacity 350,000 M.c.f., completion date fourth quarter 1953, given 21,800 tons.

Texas-Eastern Transmission Corp.: Extension of system to maintain the capacity of the present transmission system; estimated cost $25,000,000, daily capacity 200,000 M.c.f., completion date fourth quarter, given 50,200 tons.

Oil lines.—The tonnage of line pipe which PAD has received for oil lines during the third quarter has been divided primarily among 40 construction projects scheduled for completion this year. These projects are detailed in the accompanying table.

Fuel Oil's Future

Its need in Europe and refinery yields here are studied by NPC which also hears that steel plate still is short

WASHINGTON. — Slippage occurring in past quarters when many holders of priority tickets for oil-country tubular goods were unable to place their orders with the mills will be reflected in "disappointingly small" allocations in the third quarter, the National Petroleum Council was told last week by R. L. Foree, director of the domestic - production division of the Petroleum Administration for Defense.

Foree told the council the recent cutback in steel production in anticipation of a strike averted by government seizure of the mills also may be reflected in the third quarter, although it has not yet been possible to estimate the loss.

Long-range, however, he said the situation is better and measures up to previous prognostications by PAD that availability will increase.

The council covered a wide range of subjects, receiving a report on underground storage, which was not immediately released, and interim reports on the study of needed sizes of tubular goods and synthetic-liquid-fuel costs. The report on tubular goods disclosed that 1,100 replies have been received to 6,000 questionnaires on essential sizes of oil-country tubular goods, needed as a basis for determination of the size pattern of present operations.

The committee studying synthetic costs announced that it would file a final report on the subject at the next meeting.

Plate shortage.—Members of the PAD staff reported on matters within their jurisdiction.

In a discussion of materials, R. M. Morrison, director of the materials division, warned the council that regardless of what may be said to the contrary the industry will continue to experience difficulty in getting sufficient supplies of plate because of the competition of other users, and that there will be considerable difficulty in completing construction projects because of the long lead time needed on components.

Hugh A. Stewart, assistant deputy administrator, explained the setup of the North Atlantic Treaty Organization petroleum committee, now meeting in Europe, which, he said, is not an operating committee but has the status of a program division in NATO. The assistant deputy administrator for foreign operations has been named American member of the committee and the direction of the program division is chairman of the working group on supply and demand factors in an emergency.

Iranian aftermath.—In a report on 10 months' operation of the foreign voluntary aid program set up after the strike at Abadan last April, Charles E. Gately, director for District 1, disclosed that 22 schedules have been approved and issued since the plan was put into effect. One of these schedules is designed principally to remove refinery bottlenecks and make available additional refining capacity, while the other 21, covering 26,604,000 bbl. of crude and 16,628,000 bbl. of products, involved sales or exchanges between participant companies and the three companies which formerly obtained their supplies directly from Iran.

The scheduled transactions have equalled approximately one-third of Iran's output, the other two-thirds being made up by the companies formerly dependent on Iran through increased production in other areas.

Europe's fuel.—In a further discussion of the world situation and the program of the Mutual Security Agency, Cornelius J. Dwyer, chief of the MSA petroleum branch, disclosed that American oil companies will supply 617,000 bbl. daily of oil to Europe during the coming fiscal year as compared to 427,000 bbl. daily in fiscal 1949, an increase of 44 per cent. The f.o.b. value of this oil will be $650,000,000 but its dollar cost to the participating countries will be only $520,000,000 because $130,000,000 of the American - company supply will be sold for currencies other than dollars.

Dwyer told the council that over the long run it appears that fuel oil is going to have to provide the bulk of future increases in European requirements for industrial energy because of inability of the European countries to solve their coal problem.

As it stands now, he indicated, fuel oil can be imported or produced from imported crude everywhere in Europe at a cost considerably below the delivered cost of United States coal and, in most places, below the cost of British or German coal.

If Europe has to depend upon fuel oil for industrial supplies, European refineries will run 50 per cent or more of fuel oil and it will no longer be priced as a byproduct but as a prime product in line with the European demand, Dwyer predicted.

New studies.—The council adopted a report of its agenda committee recommending it make a new study of petroleum-storage capacity requested by PAD, bringing up to date its report of October 31, 1950.

The committee recommended, however, that a study of the Bunker C fuel oil situation sought by PAD be made only in part. It asked that PAD summarize the trends of domestic manufacturing, importation, and individual types of usage from 1946 to

WATCHING WASHINGTON

Bertram F. Linz

Oil Seizure Possible

WASHINGTON. — A strike of some 200,000 workers would be likely to bring about government seizure of the oil industry, according to views here.

Oil is as vital to defense as steel and the arguments that supported seizure of the steel industry would apply equally well—so well, maybe, that it might be impossible to defend not seizing the industry in the event of a tie-up.

Petroleum is one of the major and early probabilities for seizure. Others are coal, rubber, aircraft, and aluminum, all of which have wage disputes pending.

It will be remembered that a big segment of the oil industry was under government control once before—for 5 months from October 1945 to March 1946.

In the past, seized industries have been returned to their owners as soon as the wage disputes which led to seizure have been settled, and President Truman says he wants to give the steel plants back quickly. But even so, the government can do a lot of damage while it holds plants—impose the union shop, increase wages, change company policies; in short it can assume all of the prerogatives and responsibilities of management.

Worst of all is the threat inherent in the manner in which Truman seized the steel industry that if economic or political factors made it expedient the government apparently could retain control indefinitely, in effect socializing industry to be operated on official whim rather than the hard facts of competition.

The Government already is more deeply in business than many realize. Its commercial interests include shipping and barge lines, air transport and railroads, power systems, insurance (through the Social Security Act and military insurance), and synthetic rubber.

And the Government today has almost unlimited power over industry through its control of materials and prices, requirements on minimum wages and working conditions, and taxes.

Trade With Russia?

Was it trade or trick is the big question growing out of the international trade conference recently sponsored by the USSR at Moscow.

At that meeting, attended by a couple of U. S. businessmen who went over as individuals and not government representatives, Russian officials spoke blandly of a 3-year $10,000,000,000 east-west trade developed through the barter of petroleum products and other Russian commodities for those of other countries ranging from silk to ships.

Big markets undoubtedly could be found in Russia for the things that country needs. But what Russia could supply by way of payment is less clear. The Russians said they could offer some unspecified, but probably small, quantity of oil products and a few other specialties and much larger quantities of timber, wheat, furs, and other staples which formerly comprised their export trade, but the most optimistic figuring could not add them up to more than one-third of what Russia seeks to buy.

And that disparity raises the question: Was the conference an honest effort to ease world tensions or another trick in the cold war?

Truman's Battles

The Truman administration has so many fights on its hands that it is hard to count them.

Topping the list in importance are the President's seizure of the steel industry and his challenge to the House of Representatives on its cut in military spending.

The row over the firing of corruption cleaner-upper Newbold Morris, which led to the acceptance of the untendered resignation of Attorney General J. Howard McGrath is slated to continue. It seems now that Commerce Secretary Charles Sawyer asked McGrath to investigate Morris' role in some tanker deals a year before the New Yorker was picked to clean up the government, but said nothing when the appointment was made.

The Wage Stabilization Board appears definitely slated for congressional investigation, and the administration of price controls is also being eyed at the Capitol, where a suspicion is growing that the administration sees price control as a one-way street and both prices and wages as political rather than economic issues.

These are only some of the many matters which administration supporters in Congress are trying to take the sting out of before they can be elevated to the status of real issues in the forthcoming presidential campaign.

the end of this month, and advise as to the reasons for assumed diminution of the yield per barrel of Bunker C since 1946, including technological changes, and the net effect that has resulted in per-barrel yields of petroleum products.

The committee rejected that part of the request for information as to the probable bedrock minimum yield of residual to be anticipated from United States refineries and, what impediments may exist that would prevent an increase in residual yield in the event that requirements in the United States exceed the quantities available from domestic refinery operations and imports. The committee based its action on the fact that future demand-and-supply studies involve price relationships between crude and the various products, between oil products and competing fuels, and transportation cost relations, outside the scope of council activities.

During the course of the meeting, Sen. Joseph C. O'Mahoney, of Wyoming, spoke briefly, commending the oil industry for its defense effort and cooperation with the Government in seeing that vast federal expenditures were made prudently and wisely.

The council adopted a memorial resolution to the late Harold L. Ickes, noting that as Petroleum Administrator for War he set the pattern of industry-government cooperation under which NPC operates.

On the eve of the meeting, the council tendered a testimonial dinner to Walter S. Hallanan in recognition of his 5 years of service as its chairman, at which Hallanan was told the testimonial would be in the shape of an oil portrait to be painted by one of the country's foremost artists.

The council also set May 20 as the date for a dinner in honor of Bruce K. Brown, who will end his service as deputy petroleum administrator at the end of next month.

Price Hike Out

Arnall says controls will not be lifted on petroleum

WASHINGTON. — Decontrol of crude prices or suspension of ceilings was definitely ruled out last week by Price Stabilizer Ellis C. Arnall.

Testifying before the senate banking committee, now considering extension of the Defense Production Act and its possible modification, Arnall asserted flatly that "we will not suspend controls where such action would result in levels of prices or margins higher than permitted under existing regulations."

Emphasizing that suspension of price controls will be ordered only in definitely "soft market" areas,

Arnall asserted that most of the country's trade now is being carried on at peak prices.

"Especially in those commodities which are sought after by both manufacturers and government procurement agencies—basic goods like steel and other metals, fuels—there are practically no soft spots," he declared.

In such cases, he said, "the agency's pricing standards are adequate to grant adjustment where needed and they should continue to be used for that purpose."

Representatives of the Independent Petroleum Association of America discussed the crude price situation April 23 with Roger Putnam, economic stabilizer, and Price Director Arnall.

Conversion Steel

Second-quarter allotment for oil is 51,047 tons

WASHINGTON.—Authorizations for purchase during the current quarter of 51,047 tons of oil-country tubular goods made from conversion steel have been issued by the Petroleum Administration for Defense to 130 oil and gas operators.

Among the larger operators who normally drill 41 or more wells a year, 44 received allotments of 40,341 tons of pipe from conversion steel while 86 smaller operators were allotted 10,706 tons.

PAD explained that 39,913 tons of conversion pipe was allotted to operators in a primary allocation, of which 31,841 tons went to 42 large operators and 8,072 tons to 58 smaller operators. Later a supplementary allocation was made, and 8,500 tons was assigned to 11 large operators and 2,634 tons to 26 others.

First such allotments.—This was the first quarter in which PAD made separate allotments of conversion tonnage, which in the first quarter of this year was made a part of PAD's over-all allocation of steel from the Defense Production Administration.

Experience with first-quarter allotments demonstrated that most operators were reluctant to buy the higher-priced pipe when it was counted as part of their regular quarterly allotment, and PAD changed the rules to permit operators to file for conversion steel in addition to their regular allotments.

The allotments have been made on the basis of what the various brokers who handle the conversion deals have assured PAD could be available this quarter, Deputy Petroleum Administrator Bruce K. Brown explained.

"We are certain that the mills can handle the tonnages of pipe assigned in the primary allotments," Brown said. "We do not, however, have the facilities or the staff to make a complete check with the mills, so there is no guarantee that the full quantity of conversion promised will be available to fill orders based on the supplementary allocations."

Brown suggested that operators check on the firmness of supply before they enter into any contract for purchase. "With materials still in short supply, this is a case in which the warning, 'Let the buyer beware,' needs particular attention," he said.

Deadline Nears

Government hoping local deals will avert strike

WASHINGTON.—The Federal Mediation and Conciliation Servcie this week was watching developments in the oil-wage dispute closely, hoping that quick settlements of local issues would avert the threat of a widespread strike which A. O. Knight, president of the Oil Workers International Union, said might be called if negotiations were not successful by April 30.

The service, however, was dependent upon reports coming in from the field and was not participating actively in the negotiations from Washington. Although several small settlements had been reported, there was no definite indication late in the week whether the industry as a whole would be able to solve its problem by the April 30 deadline.

The Wage Stabilization Board, which had tossed the dispute back into the laps of the companies and unions after an abortive attempt to set up a procedure for settlement, also was keeping an eye on the situation but did not indicate what the next step would be if the negotiations broke down.

Speaking at the April meeting of the National Petroleum Council, Interior Secretary Oscar L. Chapman urged the companies to take advantage of the opportunity provided by the WSB to settle their wage controversies on the local level.

Chapman told the oil men that any interruption of supplies because of a strike would be very unfortunate and pointed out that they now had an opportunity to bargain with the unions without government intervention and should make every effort to bring about peace with them.

Alaskan Continuation Urged

DENVER.—Continuation of the Navy's search for oil in Alaska will be recommended to the Secretary of the Navy by the special advisory committee.

Following a recent meeting here, the committee concluded that a "balanced program involving geophysical and geological investigation and drilling" should be continued in 1953 and 1954 with emphasis to be directed on "testing the deeper pre-Cretaceous formations in suitable locations."

Members of the committee are Dr. William E. Wrather, director of the U. S. Geological Survey; Lewis W. MacNaughton, president of DeGolyer & MacNaughton; and Comdr. A. C. Morris, of the Navy Department's Bureau of Yards and Docks.

The Navy's program in Alaska is being conducted by Arctic Contractors, Inc., under contract with the Navy. Arctic Contractors is a joint enterprise formed by Exploration Contractors, C. F. Lytle Co., and Green Construction Co.

Detroit Case Argument Set

WASHINGTON.—Oral argument on the Federal Trade Commission's latest order to Standard Oil Co. (Ind.), to discontinue alleged discrimination in prices has been set for June 26.

The company has been given an extension of time to May 25 to file its brief and memoranda on the order. The commission attorneys will then have until June 21 to file their reply briefs.

The commission's presently proposed order is the outgrowth of the Supreme Court decisions last year affirming the right of Standard to claim good faith as a defense for price discriminations allegedly in favor of four large customers in the Detroit area *(The Oil and Gas Journal, January 11, 1951, page 48)*.

That decision returned the case to the commission for action in conformity with the court's ruling, and the commission issued a new order based on a finding that the company had not proved good faith as the reason for the discrimination.

Washington Briefs

WASHINGTON.—The export quota of tin plate for petroleum packaging for the third quarter has been cut by the Office of International Trade to 12,500 tons from a second-quarter quota of 14,500 tons. The cut was made because of the seasonal requirement for more tin plate for food packing, for which an additional 2,000 tons was provided.

WASHINGTON.—Modification of the provisions of PAD Order No. 2, restricting the expansion of natural-gas service, has been granted to Consumers Power Co., Jackson, Mich., to permit it to provide service for 15,000 new domestic consumers over the next 12 months, and to Michigan Gas Utility Co., Coldwater, Mich., and Niagara Mohawk Power Corp., Syracuse, N. Y., to serve individual plants.

N.P.A. LEADERS.—Here is a group of several leaders in the National Petroleum Association and two of the speakers at the organization's forty-ninth semiannual meeting in Cleveland. Left to right are C. Z. Hardwick, vice president, Ohio Oil Co.; Arthur W. Phelps, petroleum-section attorney, Office of Price Stabilization; Earle M. Craig, N.P.A. president and chairman of the board, Freedom-Valvoline Oil Co.; L. C. Kemp, Jr., director of research, The Texas Co.; and Rex S. Blazer, president, Ashland Oil & Refining Co. Kemp and Phelps were among the speakers at the meeting; Blazer and Hardwick are members of the association's board of trustees.

Oil Pricing Policies

Shortages don't justify boost in products prices, OPS official tells N.P.A.; "open mind" on crude hike claimed

Dahl M. Duff

CLEVELAND.—The Office of Price Stabilization has no authority to solve distribution problems by price adjustments, and a shortage of a certain petroleum product is not justification for a price increase.

So said Arthur W. Phelps, attorney in the OPS petroleum section, in an address delivered during the forty-ninth annual meeting of the National Petroleum Association, the industry's oldest trade group.

Dwelling on last fall's petition by East Coast marketers for an increase of ½-cent a gallon in the price of No. 2 fuel oil, Phelps said the agency looks at the question of whether prices are fair and equitable rather than how they are related to a supply-demand situation.

A proposed increase in the ceiling on No. 2 on the basis of a shortage, he said, is "a dead issue," He said OPS will examine this problem at all levels and that "it is our desire to have an adjusted East Coast ceiling price for this product available for industry use before the beginning of the next contractual season."

Crude-price hike.—Other comments by Phelps gave further evidence of the Government's position to a general increase in the price of crude oil. He said it is essential to price stabilization that the Government maintain a "good check rein" on raw-commodity ceilings.

"When the crude-oil regulation was drawn up, OPS was given to understand that during the base period the price of almost all crude oil in the various producing areas was reasonably related to the general level of prices and to the level of prices for petroleum products," he said.

"However, it developed later that there were instances where the price was depressed during the base period. OPS took immediate action through Supplementary Order No. 2 to CPR 32, providing increases to producers whose price was below the prevailing price . . . in the same general producing area. This order has worked out reasonably well."

Products policy.—In such cases, OPS does not permit an increase in the prices of products because:

1. The ordinary market level of products is based on the general level of crude prices and not on an average price for crude which includes low-priced crude from sources where the price was depressed;

2. An increase granted only one refiner would be nullified by normal marketing practices which would prevent the one refiner from obtaining anything additional for his product.

"We hope it will not be necessary to make any over-all increase in the price of crude petroleum, although we are keeping an open mind, particularly in areas where high operation costs are unavoidable," Phelps said.

Panel on labor.—In a panel discussion of the labor issue, William Montgomery, industrial-relations manager for Socony-Vacuum Oil Co., Inc., said that prospects for eventual settlement of the dispute are good if the unions wil make an honest attempt to bargain in good faith on a local basis.

Montgomery restricted his remarks to Socony's position alone. He made it clear that in his company's case the status of the disputes varies widely and that only one of these disputes might possibly have reached the strike stage. This is the Detroit marketing operation.

Socony believes the cases must and will be settled on a local basis. Any effort to bring a board in Washington into the dispute tends to lead to industry-wide bargaining.

Guy Hunter, vice president of Quaker State Oil Refining Corp., declared that Pennsylvania refiners definitely did not want to lump their disputes in with those of other companies.

The different set of conditions under which these plants operate applies also to small refiners elsewhere. The smaller plants obviously have a different economic setup, Hunter said. They need more flexibility in job assignments and work loads. For the higher classifications, the usually, and necessarily, have a lower wage scale than the major operators, he said.

Products Exports Down

WASHINGTON.—Exports of major petroleum products dropped to an average of 164,100 bbl. daily during the week ended March 28 from 185,600 bbl. daily in the preceding week, according to figures released by the Petroleum Administration for Defense.

The export figures were marked by

a sharp increase in kerosine shipments to the highest level reached since the week ended January 18. Exports of motor gasoline dropped almost to the vanishing point and shipments of the other three products also declined.

Average daily exports of the several products during the week, compared with the preceding week, and average shipments for the 4 weeks ended March 28 are shown in thousands of barrels in the accompanying table.

	Week ended Mar. 28	Week ended Mar. 21	Average 4 weeks
Aviation gasoline	30.2	33.1	30.5
Motor gasoline	1.1	11.7	7.1
Kerosine	44.0	10.3	25.2
Distillate	53.5	66.3	37.8
Residual	35.3	64.2	53.4
Total	164.1	185.6	154.0

Load on Refineries

PAD's Burrill sees demand taking new plant capacity almost as fast as it's built—reserve not forthcoming until 1954

WASHINGTON.—A total domestic and export demand for crude and products of 8,702,000 bbl. daily was forecast for the first quarter of 1953 last week by Cecil Burrill, director of the program division of the Petroleum Administration for Defense.

Submitting new supply-and-demand figures to the National Petroleum Council, Burrill said next year's first-quarter demand will require a domestic production of 6,501,000 bbl. daily, imports of 985,000 bbl. daily, and crude runs to stills of 6,906,000 bbl. daily.

Burrill estimated that the 1952 averages will be 7,821,000-bbl.-daily total demand, 6,345,000 - bbl. - daily crude production, 893,000 - bbl. - daily imports, and 6,714,000 - bbl. - daily crude runs.

Assuming the Abadan refinery will not come back into service and anticipating normal weather, Burrill said, PAD estimates indicate that refining operations abroad will have to continue at abnormally high levels and United States refineries will have to operate near capacity in order to meet domestic demands and exports that are still affected by the loss of Abadan production.

Operations tight.—The 6,900,000 bbl. daily of crude that United States refineries will have to run in the fourth quarter this year and the first quarter of 1953 in order to meet local civilian and military demands and cover the shortage abroad will be in excess of 91 per cent of capacity, he said.

Because refinery construction has fallen behind the growth in demand, chiefly because of lack of materials, the refinery expansion now being undertaken will not reestablish much reserve capacity before 1954, Burrill told the council.

Burrill explained that the estimate of next winter's refinery runs takes into account the relatively improved stock situation on April 1 as compared with the same date in 1951. At the beginning of this month U. S. stocks of the four major products were 8,900,000 bbl. above a year ago. If District 5, where stocks declined 11,700,000 bbl. during the 12 months ended April 1 because of large military demands, is eliminated, stocks in the balance of the country actually increased 20,600,000 bbl., almost equally divided between Districts 1 and 2.

Crude stocks increased 20,700,000 bbl. over a year ago to a level of approximately 257,000,000 bbl.

No tanker relief.—Burrill reported that no relief from the tanker shortage, which has prevailed since the start of the Korean war, is in sight for next winter and probably not through 1953. This is another factor making it necessary to maintain refining operations at high levels during the current and coming quarters in order to store products for use next winter.

Preliminary estimates indicate that in the 12 months ending in November approximately 65,000,000 bbl. of all kinds of tankage will be built. While most of this will be working tankage, it will provide some additional space for seasonal stocks. All seasonal tankage should be filled by the start of next winter in the interests of saving both refining capacity and tanker transportation, Burrill warned.

Producibility.—Crude producibility in the U. S. as a whole will be adequate through next winter, particularly when major pipe lines now under construction are completed. However, California will continue to be short of crude, and it will be necessary to divert military liftings to other areas.

Burrill explained that the estimates are based upon an increase in total United States demand this year of 4.7 per cent, in contrast to gains of 11.1 per cent in 1950 and 9.6 per cent in 1951. The figures assume no material change in the international or military situations and that government expenditures will sustain business activity at or slightly above the present high levels. It also is assumed there will be no effective limitations on the manufacture of such consuming equipment as automobiles and oil burners.

Another assumption basic in the estimates is that there will be no price impediments which will interfere with the supply of petroleum products, particularly the movement of products from the Gulf to the East Coast.

Products demand.—Assuming normal weather, Burrill said, distillate demand next winter is expected to be 10.5 per cent or 180,000 bbl. daily higher than last winter. In order to meet this demand, it will be necessary to obtain distillate yields of 22.1 and 23.1 per cent in the fourth quarter of 1952 and first quarter of 1953, respectively.

Relatively high runs and distillate yields also should take place during the second and third quarters of this year to assure adequate distillate supplies next winter.

Motor gasoline demand for 1952 is expected to be up 4.9 per cent over 1951.

Residual fuel-oil demands are estimated at 1,634,000 bbl. daily through the year, up less than 1 per cent over 1951. If the reduction in yield of residual falls less than 0.6 per cent under last year, there should be no problem in meeting demand for the country as a whole, although distribution will be uneven with an excess in District 2 and tight-supply conditions in Districts 1 and 3.

"The tendency during the past year toward excess supply in District 2 will probably continue during the year ahead unless crude runs are adjusted and residual yields are reduced," Burrill said.

Although civilian demands in District 5 are increasing at a slower rate than for the balance of the country, production essentially at MER and recent discoveries at low levels give little prospect that production will keep pace with demand, Burrill reported.

It will be necessary for the Armed Services Petroleum Purchasing Ageny to buy from 50,000 to 75,000 bbl. daily of its West Coast requirements from other areas until additional crude is made available in District 5 from outside sources.

WEST COAST

Exclusive Dealing Hit

WASHINGTON.—The Supreme Court last week affirmed a decision of the Los Angeles Federal Court holding that Richfield Oil Corp. violated the antitrust laws by entering into exclusive-dealing contracts with its customers.

The court's decision was noted in an unsigned order unanimously agreed to by all seven justices who participated in consideration of the case.

The court noted that the issues in the Richfield case were substantially the same as those raised in the case against Standard Oil Co. of California which it decided last June 13. In the Standard case, the court barred the company from entering into or enforcing exclusive-dealing contracts.

Octanes: No Change Yet

Quarterly Du Pont survey shows nation's average regular rating is 83.2, premium 89.9; ratings to rise this spring

OCTANE numbers for both premium and regular grades of gasoline averaged the same at the end of the first quarter of this year as at the end of last December, according to the latest quarterly survey of the petroleum-chemicals division of E. I. du Pont de Nemours & Co., Inc.

The unweighted average of premium octane numbers for the 47 cities included in the survey was 89.9, unchanged from the last survey but down 0.3 from the average at the end of the first quarter last year.

The numbers are expected to rise this summer, with refiners generally agreed that premium will climb one or two numbers and regular will go up about one. *(See The Oil and Gas Journal, April 7, page 82).*

Average TEL content for premium in the same cities was 1.94 cc. per gallon at the end of the first quarter this year compared with 1.75 cc. at the end of December and 2.21 cc. at the end of the first quarter last year.

Quantitative restrictions on the use of TEL by refiners were suspended at the end of March by Petroleum Administration for Defense following a gradual easing in TEL supply for several months. *(The Oil and Gas Journal, April 7, 1952, page 86).*

Since the samples in the Du Pont survey were taken at service stations between March 27 and March 31, the octane numbers of the gasolines did not reflect the unrestricted use of TEL. However, the increase in the amount of TEL per gallon was probably due to the fact that refiners' allowable consumption was raised in February to 107 per cent of the 1951 authorized usage.

A total of 36 cities had more TEL per gallon of premium gasoline in the latest survey than in the survey conducted at the end of the year. Decreases were reported for 10 cities while one was unchanged.

The unweighted average of regular grade octane numbers at 83.2 was unchanged from the previous report but down 0.5 from the corresponding survey last year.

Average TEL content for regular grade was 1.52 cc. per gallon compared with 1.36 cc. on the last survey and 1.83 cc. at this time last year.

GENERAL COMPARISONS*

	Apr. 1951	Jan. 1952	Apr. 1952
Premium:			
Research octane No.	90.2	89.9	89.9
TEL content (cc. per gallon)	2.21	1.75	1.94
Regular:			
Research octane No.	83.7	83.2	83.2
TEL content (cc. per gallon)	1.83	1.36	1.52

*Unweighted averages of figures for 47 cities.

COMPARISON OF MOTOR-GASOLINE SURVEYS

(Octane numbers are by research method; arithmetic averages by cities)

	Premium				Regular			
	Oct. No.			TEL content cc. gal.	Oct. No.			TEL content cc. gal
	Apr. 1951	Jan. 1952	Apr. 1952	Apr. 1952	Apr. 1951	Jan. 1952	Apr. 1952	Apr. 1952
Aberdeen	89.7	88.5	89.0	1.86	82.2	81.8	81.5	1.27
Amarillo	87.8	88.0	88.8	2.07	80.1	80.4	81.4	1.87
Atlanta	91.7	91.3	91.8	1.71	85.4	84.7	84.6	1.82
Bakersfield	90.2	89.6	89.5	2.55	80.7	80.4	80.4	1.27
Baltimore	92.6	92.6	92.5	1.60	86.3	86.3	86.7	1.50
Boston	92.2	92.2	91.6	2.13	86.8	86.9	86.6	1.79
Calgary	84.2	85.9	86.1	2.55	80.1	79.3	80.0	1.54
Casper	89.0	89.0	88.3	1.51	81.7	81.0	81.9	1.26
Charlotte	92.4	91.5	91.7	1.91	85.4	85.3	85.0	2.00
Chicago	89.4	89.3	89.2	1.73	83.0	82.0	82.2	1.54
Cincinnati	91.5	91.1	90.7	2.04	85.9	86.0	86.0	1.86
Cleveland	91.6	91.0	90.6	1.95	86.8	86.4	86.4	1.37
Columbus	91.5	91.5	90.5	2.24	86.2	86.4	86.1	1.66
Corpus Christi	92.1	90.6	91.1	2.02	85.3	83.2	84.4	1.73
Dallas—Fort Worth	91.6	91.6	91.4	2.08	84.3	83.9	83.1	1.82
Denver	88.9	88.3	88.5	1.46	81.8	81.0	80.4	1.22
Detroit	91.1	90.7	90.5	2.10	85.9	85.6	85.9	1.47
El Paso	86.1	85.6	85.7	2.52	78.7	77.7	77.3	1.23
Great Falls—Billings	90.0	90.0	90.4	1.80	82.2	82.0	82.2	1.19
Houston	92.4	91.6	92.0	2.11	85.5	84.4	85.0	2.17
Indianapolis	89.9	89.5	89.9	1.83	84.1	83.3	83.0	1.42
Jacksonville	91.7	91.4	91.4	1.98	85.5	85.4	85.1	1.83
Kansas City	89.8	89.0	88.6	1.47	83.2	82.3	81.7	1.43
Little Rock	90.8	90.4	90.5	1.52	84.5	83.4	83.9	1.18
Los Angeles	90.2	90.1	89.7	2.14	81.7	82.0	81.7	1.29
Louisville	90.7	90.4	90.2	2.23	84.6	84.1	84.4	2.11
Memphis	90.6	90.9	90.9	1.94	84.6	83.9	83.3	1.89
Milwaukee	90.2	89.6	88.8	1.62	82.7	82.9	82.6	1.16
Minneapolis	89.7	88.6	88.8	2.04	82.9	82.3	82.2	1.43
Montreal	89.4	89.9	89.8	1.39	85.0	84.7	84.8	0.79
Nashville	90.2	90.7	90.4	1.70	85.0	83.8	83.9	1.83
New Orleans	91.8	90.2	91.2	2.10	84.7	83.8	84.1	1.65
New York (met. area)	92.1	92.2	92.0	1.97	86.5	86.4	86.7	1.58
Omaha	89.2	88.7	88.6	1.71	82.2	81.8	81.6	1.10
Philadelphia	92.3	91.8	91.5	1.60	86.8	86.5	86.3	1.35
Pittsburgh	91.9	92.0	91.5	1.95	86.3	86.2	86.4	1.89
St. Louis	89.8	89.0	88.7	1.87	83.0	82.4	82.2	1.43
Salt Lake City	88.3	88.9	89.2	1.97	79.1	79.7	79.6	1.25
San Francisco	91.1	90.4	90.3	1.59	81.9	81.8	81.4	0.90
Seattle	90.3	90.1	90.2	2.25	82.4	80.7	81.2	1.35
Shreveport	90.8	90.3	90.2	2.51	84.7	83.8	83.5	2.33
Spokane	90.8	89.2	90.0	1.56	82.7	81.6	81.8	1.02
Toronto	89.0	90.1	89.0	2.03	84.7	85.4	85.3	1.33
Tulsa	89.8	89.2	89.4	1.80	82.5	82.3	82.0	1.47
Vancouver	88.5	88.7	88.7	2.57	83.5	83.6	83.4	1.91
Wichita	88.2	87.2	87.0	1.94	81.3	80.8	80.7	1.62
Winnipeg	87.2	87.1	88.3	1.98	83.3	82.8	82.4	1.23

Storage Savings

Pipe liners put emphasis on costs in annual meeting

Paul Reed

FORT WORTH.—Painting an 80,000-bbl. gasoline-storage tank white instead of aluminum will save as much as $1,500 a year in evaporation losses.

This method of achieving more economical product storage was laid before the Products Pipe Line Conference of the American Petroleum Institute here last week by S. S. Smith, of Shell Oil Co.

Where adverse conditions make the use of white paint on the tank roof impracticable, Smith advocated painting the side walls white and the roof aluminum. The best arrangement, however, is to paint the entire tank white, he said.

River crossings. — In pipe-line river crossings, the importance of continuity of service justifies large expenditures to safeguard against scouring, erosion, and corrosion, John R. Giese, of Great Lakes Pipe Line Co., told the audience.

Scours occurring in a relatively narrow channel of the Missouri River near one Great Lakes crossing have been measured to a depth of 50 ft. below normal bottom by means of a supersonic depth indicator, Giese said.

Giese's paper and the discussion following emphasized the need for both deep trenching of river crossings and for use of ample slack.

Dehydration costs.—R. P. Dougherty, of Wyco Pipe Line Co., told the pipe

PIPE-LINE EXECUTIVES attending the A.P.I. conference in Fort Worth included, left to right, J. W. Boyd, vice president of Phillips Pipe Line Co., Bartlesville; Bruce H. Mackenzie, chief engineer of the pipe-line department of Imperial Oil, Ltd.; Floyd E. Warterfield, president of Pipe Line Engineering Co., Dallas; and W. K. Borland, chief engineer of Plantation Pipe Line Co., Atlanta.

liners his company's 1951 dehydration costs were 90 cents per 1,000 bbl. By operating the line at a rate of 20,000 bbl. per day, he said, the cost can be reduced to 68 cents, he said.

New construction. — James E. Boice, special assistant to the director of the supply and transportation division of the Petroleum Administration for Defense, said present industry plans call for laying approximately 10,000 miles of petroleum lines this year.

Of this amount, 6,500 miles will be crude lines and 3,500 miles product lines, he said.

In discussing the materials-supply situation, Boice said marked improvement is expected after September. The country is now emerging from a period in which PAD was trying to meet a situation in which supply was only 70 per cent of demand.

New equipment seen.—A new type of batch change indicator was observed in operation at Sinclair Pipe Line Co.'s Arlington station during a field trip sponsored by Humble Pipe Line Co., Magnolia Pipe Line Co., and Sinclair.

The indicator functions as a continuous sampling device which indicates batch changes a minute earlier than they can be detected by conventional color or hydrometer tests.

In this instrument there is a continuous flow of products between two metal plates of a capacitor, the capacity of which changes with any change in products. This device, known as an electronic products indication recorder, was developed by the Sinclair organization and Nelson Electric Co.

In discussing recent developments in techniques, attention at the meeting was directed to experimental work being done by a major products line with the use of two plugs or scrapers at batch interfaces. In lines where friction was measured at 2 watts per foot, a 2° F. rise in temperature was observed in the soil. In meeting the problem of removing ice forming in lines in northern climates, scrapers were recognized as the only effective means.

Distillate Forecast

Demand to be up 10 per cent next year but supply will be adequate, Bartlett says; more storage, price hike needed

PHILADELPHIA. — Assuming the weather is no colder than normal, nation-wide demand for distillate fuels and kerosine during the 1952-53 heating season is expected to be about 10 per cent greater than the current season, according to R. M. Bartlett, Gulf Oil Corp. vice president in charge of domestic marketing.

Giving his own company's estimates, Bartlett said it is anticipated that the distillate-kerosine demand increase in District 1, the Northeast, will be between 12 and 15 per cent. Last year, despite natural-gas competition and material shortages, 675,000 additional oil-consuming units were installed in the country to boost the use of distillate fuels by 12 per cent.

The Gulf official spoke at the twenty-ninth annual exposition and convention sponsored by the Oil Heat Institute. He said careful surveys show that ample crude will be available to meet oil demand and that refinery capacity will be "just adequate," with refiners always in a position to maximize distillate yields in case of need.

Price troublesome. — This leaves unrealistic price ceilings, transportation, and storage capacity as the most likely sources of future trouble in heating and fuel-oil supply, he said.

However, it is necessary to recognize that there is competition within the industry for the various petroleum fractions, and that with annual demand for distillate fuel oil increasing considerably faster than demand for gasoline, refinery economics requires a gradual narrowing of the price gap between the two products. This would provide refiners with the necessary incentive to shift their yields.

Bartlett said the difficulty PAD encountered this spring in getting sufficient heating oil to the Northeast before the voluntary agreement showed that unfair price controls tend to create shortage.

"With high uncontrolled tanker rates again staring us in the face for the coming heating season, it is imperative that OPS either immediately decontrol distillates—and this is preferable—or else relieve the present costly squeeze now existing between the Gulf Coast and the Eastern Seaboard by increasing the present unrealistic ceilings enough to provide an incentive to oil companies to transport sufficient products to northern terminals," he declared.

Storage needed.—Regardless of what happens insofar as price is concerned, the industry must have more storage. It is necessary, Bartlett said, to provide for about 153,000,000 bbl. of additional storage capacity, half of which is required for clean products at pipe lines, tank farms, and terminals. This represents a 14 per cent increase over the tankage estimated available on July 1 this year.

"Don't forget refineries had to curtail runs last year principally due to insufficient storage," he said. "Each of you should review your storage position carefully and consider adding to it as soon as you can get the steel. . . . I realize that an even load for fuel oils through the year is Utopia, but I cannot urge you too strongly to lay plans so that your tankage construction program over the next 2 years makes it possible for the cargo buyers to take as much as 50 per cent, and other resellers with storage, as much as 40 per cent of their annual requirements by December 1, 1953."

Bartlett reviewed the general position of the industry and stressed that long-term availability of crude will be adequate, provided economic incentives, including the depletion allowance, are retained. He told the heating-oil dealers and burner manufacturers that imports will play an increasingly vital part in the country's oil supply.

Better Scavenger

Spark-plug fouling reduced sharply in auto and aviation engines by use of tricresyl phosphate, Shell tests show

CLEVELAND.—Extensive research work by Shell Oil Co. has shown tricresyl phosphate to be highly effective in minimizing spark-plug fouling.

Speaking before the National Petroluem Association here, T. B. Rendel, Shell official, said the company ran hundreds of tests on various scavenger combinations and concentrations with additives which would react preferentially during combustion with the residue of metallic lead. This metallic lead, fixed as the primary cause of current plug fouling, is not easily removed, Rendel said, because of its stability.

During a detailed study of the use of phosphorus compounds, Shell found that tricresyl phosphate was extremely effective in reducing fouling in both aviation and automotive engines.

In a small aviation engine on the dynamometer, the conventional scavenger gave a fouling time of about 4 hours under controlled conditions, while a special TCP (tricresyl phosphate) scavenger mix permitted satisfactory operation for 62 hours with no evidence of fouling.

Furthermore, the same supplemental TCP scavenger added to motor gasoline effectively reduced occurrence of automotive spark-plug fouling in a number of engines under test conditions which normally produce noticeably poor plug behavior.

Prevention mechanism.—The mechanism by which TCP relieves plug fouling was believed to be the prevention of metallic lead, Rendel said, but these additional factors should be noted:

1. Lead salts of lower electrical conductivity than lead oxybromides are formed.

2. The deposits are such that they slough off more readily and are generally soft and powdery.

3. Deposition of free carbon is reduced, in turn minimizing the reduction of lead salt to metallic lead.

In various physical and chemical tests, it was found that the small amount of TCP necessary has essentially no effect on the usual fuel-inspection properties, except for apparent gum values, he said. The gum values by the present test methods are increased somewhat because of the low volatility of the additive. This increase can be accounted for by the quantity of TCP added to the fuel. No increase in gum deposition or lacquering has been found in engine operation.

Test results.—Reviewing results of tests of TCP as an additive or leaded aviation fuel, the author stated that the compound will contribute significantly to overcoming one of the major headaches of airline operation.

In the automotive field, laboratory tests indicated TCP gave about a 100 per cent increase in plug life. It is, of course, he said, too early yet to recommend that alternate scavengers such as TCP be incorporated in all automotive gasolines.

Catalyst trends.—Trends in the development of cracking catalysts were traced in another technical paper by C. O. Brown, American Cyanamid Co., on "Fluid Cracking Catalysts—1942 to 1952."

Several new types of fluid units are being developed, he said, in which the main feature is the greater velocity in both regenerator and reactor. Whether particle size of catalyst will be satisfactory remains to be seen. It may be necessary to return to the coarser catalysts.

Engaging in what he called "blue sky" thinking, Brown said another possible future development was a multifunctional catalyst for use in both catalytic cracking and catalytic reforming.

New Oil Areas Remain

Even with half a million producers, we still have more places to look, Levorsen says; wildcats will find oil

F. Lawrence Resen

HOUSTON.—There is still plenty of oil in the Americas for the finding and any shortage within the foreseeable future would result from failure to make the necessary exploration effort, A. I. Levorsen, Tulsa geologist, said last week.

Speaking before the Inter-American Commerce and Industry Conference, sponsored by National Association of Manufacturers, Levorsen said the petroleum resources of the Americas include producible reserves of 46 billion barrels of crude oil and 200 trillion cubic feet of gas, as well as solid-petroleum supplies 10 to 15 times as great.

However, these liquid and gaseous reserves represent a working stock which must be augmented by continued exploration, and the solid- petroleum supplies require expensive manufacturing which is not economically sound with as much liquid production as is available, he said.

Needed tools.—As a basic must in improving a country's reserves, Levorsen urged the widest use of scientific thinking and methods and the drilling of the largest possible number of wildcats. The average wildcat venture, he said, costs about $100,000 — including geological and geophysical surveys and lease costs—and there are approximately 8 dry holes to every new pool. Three out of four of the pools are small or noncommercial, yet each discovery costs an average of nearly a million dollars.

In recent years in the United States, for each thousand wildcats drilled, there were discovered about 25 gas pools, 62 oil pools of less than a million barrels of oil—many nonprofitable—and 19 pools of more than a million barrels, only one of which was larger than 50 million barrels. Levorsen emphasized his figures by pointing out that 50 million barrels of oil is only an 8-days' supply for the United States or a 6-days' supply for the Americas.

Foreign effort.—Levorsen urged participants at the conference to encourage exploration of oil in their particular countries. He said there is no reason to believe that the United States would necessarily be the leader in years to come. As an example of the shifting of the oil play, he cited the movement from Pennsylvania to Texas.

In addition, he said that, although there are now around half a million producing wells in the United States, compared to 15,000 in all the rest of the Americas, the feeling exists among experienced oil men that there is still no lack of places where oil may yet be found here.

Venezuela.—The manner in which oil can help a nation's economy was cited by Dr. Guillermo Zuloaga, Caracas, Venezuela, a member of the board of directors of Creole Petroleum Corp.

He pointed out that national income is 26 times what it was 30 years ago, while the international gold reserve is 12 times what it was then.

Zuloaga explained his government's setup which provides for a ministry staffed by petroleum engineers, geologists, gas-conservation specialists, and other trained men who work with their counterparts in the oil companies and who advise the government on oil policy.

America needs your daily pound of scrap

IF every man, woman and child in America provided one pound of scrap each day, they would supply just about enough to produce the 105 million tons or more of new steel that the industry hopes to make in 1952.

Like yeast in breadmaking, scrap is essential to steelmaking. Scrap speeds up the process because scrap is already-refined steel. Every ton of scrap used replaces one ton of pig iron. Thus scrap also saves raw materials, because each ton of pig iron represents two tons of iron ore, one ton of coal and half a ton of limestone.

The continuing co-operation of every reader of this page is urgently requested to overcome a scrap shortage daily growing more critical. Turn in--by selling your scrap to regular scrap-gathering channels--any and all broken, worn-out or obsolete things made of iron and steel--machines, tools, pipe, boilers, structural parts and other "junk" you'll probably never use again.

Do your part in the campaign to help meet America's need for more steel. Enlist now for the duration. Remember that the scrap you furnish may help you get more steel.

YOUR SCRAP YOUNGSTOWN IS NEEDED

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
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MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment

Busiest Drilling Area

Spraberry trend completing producing wells at a rate of 6 per day, claims one-fourteenth of all operating rigs

Roy F. Carlson

MIDLAND.—The Spraberry trend still is the busiest drilling area in the nation.

Wells are being completed at a rate of about 6 per day, adding steadily to the productive capacity of the trend's fields.

The 6-a-day rate puts the trend area, alone, ahead of all states except Texas and Oklahoma in total oil and gas completions. Oklahoma, for example, averaged 11 wells per day; Texas, aided by Spraberry, averaged 30 per day. Louisiana, generally considered a busy oil state, averaged 4½ producers daily.

This rapid completion rate undoubtedly will continue for some time. On April 11 there were 195 rigs drilling in Spraberry fields or to the Spraberry depth at wildcat locations.

As shown in the accompanying table, nearly all of these rigs were drilling in the trend area of Midland, Upton, Reagan, and Glasscock counties. A few were operating in isolated fields away from the trend proper, and eight wildcats were making hole.

Spraberry's 195 rigs represents about a fourteenth of all rigs now operating in the United States.

Tex Harvey field, the oldest in the trend, leads the rest of the field in cumulative production and total wells. The Driver area is the busiest with 50 active rigs. This area is second in total production and was second in calendar day allowable on April 11.

Five fields in the trend have already produced over 1,000,000 bbl. of oil: Tex Harvey, Driver, Pembrook, North Pembrook, and Germania, ranking in that order.

Spraberry Deep field has also produced more than 1,000,000 bbl., but it is not normally considered part of the trend since it seems to represent a kind of reservoir different from most of the rest of the trend.

Spraberry Trend Drilling and Production Status

(April 11, 1952)

Field and county—	Locations	Active rigs	Weeks comp.	Accrued comp.	Zone†	Est. cal. day allow.	Est. cum. total prod.
Aldwell—Reagan	9	10	2	36	U-L	3,020	144,344
Benedum—Upton, Reagan	8	13	2	75	U-L	6,143	794,367
Driver—Midland, Reagan, Glass.	27	50	12	258	U-L	22,807	2,838,438
Flatrock Sp.—Upton	1	1	0	3	L	170	34,769
Glass Sp.—Martin	0	0	0	3	L	94	19,489
Germania—Midland, Martin	11	3	1	70	U	5,313	1,064,104
E. Gail—Borden	0	0	0	1	U	60	10,780
N. Gail—Borden	0	0	0	1	U	0	2,337
S. Gail—Borden	0	0	0	1	L	0	1,595
Huddle-Manning—Dawson	0	0	0	1	U	100	33,489
Midkiff—Midland, Upton	8	11	3	58	U-L	4,884	583,887
Pegasus Sp.—Upton	0	0	0	1	L	27	2,046
Pembrook—Upton, Reagan	25	9	5	130	U-L	10,920	1,413,773
N. Pembrook—Upton, Reagan	54	33	6	145	U-L	12,905	1,274,588
Scharbauer Sp.—Midland	0	0	0	1	U	44	1,381
Smith Sp.—Dawson	0	1	1	4	L	348	48,266
Snowden Sp.—Dawson	0	0	0	4	L	266	45,107
Spraberry Deep—Dawson	1	0	0	39	L	2,102	1,829,489
Tex Harvey—Midland, Glasscock	89	34	9	473	U-L	37,730	8,382,333
Warfield Sp.—Midland	0	0	0	1	U	32	1,705
Weddell—Reagan, Sterling	0	1	1	22	U-L	1,478	120,583
Weiner-Floyd—Midland, Upton, Reagan, Glasscock	38	21	2	124	U-L	10,900	1,014,375
Total	*276	*195	44	1,452		119,343	19,661,245

*Location total includes 1 in Martin County, and 2 each in Midland and Reagan counties. Rig total includes 1 in Borden County, 3 in Dawson County, 1 in Martin County, 2 in Reagan County, and 1 in Upton County. All of these are wildcat drilling locations or operations. †U designates Upper Spraberry, L, Lower.

Texas Cuts Output

May production to average below 3,000,000 bbl. daily

AUSTIN. — Crude-oil production in May will be at a lower level than April and considerably below that of March.

The Texas Railroad Commission set the May allowable at 2,932,120 bbl. daily, a cut of 176,102 bbl. daily compared with the allowable in effect April 19. The reduction is the largest cut in more than a year.

It was brought about by lower purchasers' nominations, increased aboveground stocks of crude oil, and higher stocks of gasoline.

Purchasers' requests totaled 3,068,266 bbl. daily, down about 2 per cent from the April figure. Aboveground stocks of crude oil stood at 258,450,000 bbl., an amount which was tending to increase by one to two million barrels each week. Mid-April gasoline stocks of 158,304,000 bbl. of gasoline, a commission spokesman said, "indicated we are still accumulating excess stocks." Anticipation of a normal seasonal decrease in demand was another factor influencing the decision to cut the May allowable.

The commission order is based on 21 production days for the state as a whole and 19 days for East Texas field. Exceptions of importance are 20 production days for 14 fields in West Texas which deliver to the Phillips Petroleum Co. Goldsmith gasoline plant; 6 producing days for Pickton field; 15 producing days for Hawkins field; and 14 days for Pantex field. No production was allowed in Fort Chadbourne field, which was shut in last February because of excessive gas flaring.

While most producers and purchasers were in accord with the commission's plan for a 21-day producing month, some exceptions were voiced. A Humble Oil & Refining Co. spokesman asserted, "We have firm demand for 23 days' production and still would have to draw 20,000 bbl. daily from stocks." A Gulf Oil Corp. official said increased pipe-line facilities made his company favor a 22-day order.

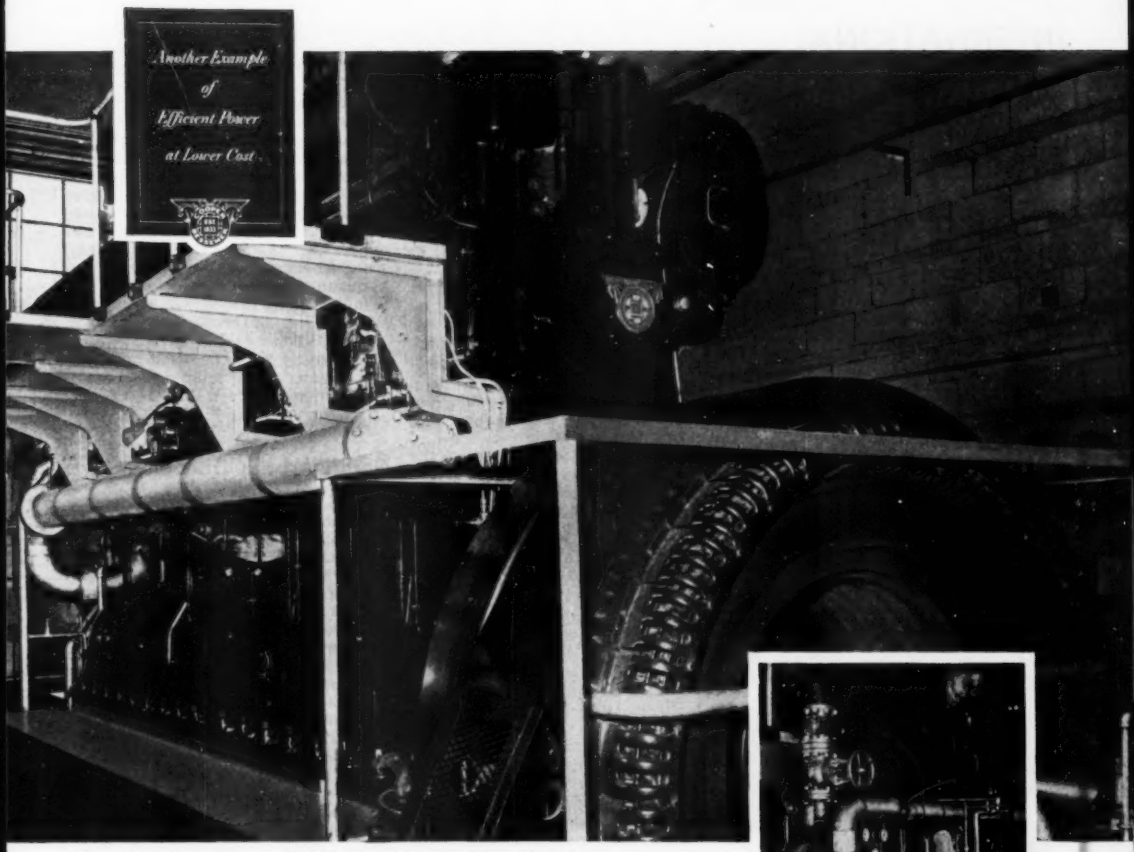
The May 1 crude oil production allowables for railroad commission districts follows.

District:	April 12	May	Change
1	38,196	37,318	— 878
2	168,473	156,531	— 11,942
3	504,151	478,438	— 25,713
4	275,351	259,138	— 16,213
5	65,509	59,774	— 5,735
6 (Outside E. Tex. field)	130,848	121,640	— 9,208
6 (E. Tex. field)	277,544	269,073	— 8,471
7-B	111,924	106,651	— 5,273
7-C	152,074	142,599	— 9,475
8	1,067,411	999,542	— 67,869
9	207,978	199,879	— 8,099
10	101,553	101,537	— 16
Total	3,101,012	2,932,120	—168,892

Magnolia Buys Production

DALLAS.—Magnolia Petroleum Co. has purchased a half interest in the properties of J. J. Perkins in Northwest Extension and Hirschi fields of Wichita County.

The company said the transaction involved 150 producing wells and leases on 2,600 acres. Consideration involved was not announced.



Latest of three Cooper-Bessemer LS-8 diesels in International Latex plant, this supercharged 1700 hp unit provides 40% thermal efficiency. End view at right shows piping setup for jacket water heat recovery contributing to 80% over-all thermal efficiency.

How they stretch dollars at International Latex

● Here's a diesel plant that is turning in amazing results—*80% over-all thermal efficiency!* The engine is a Cooper-Bessemer supercharged LS-8, installed in the International Latex plant at Playtex Park, Dover, Delaware.

To start with, this modern LS diesel exceeds 40% thermal efficiency — performance rarely equalled! On top of that, an ingenious jacket water heat recovery system captures for processing use another 40% of the total heat input.

In all there are three Cooper-Bessemer LS-8's in this International Latex plant—the supercharged unit shown above and two previously installed atmospheric LS-8's. Later on these original LS-8's can be easily converted to supercharged operation to boost their output and to match the remarkable efficiency of the new unit.

Whatever your power needs may be, check with Cooper-Bessemer. Find out how much you stand to save by the best to be had in efficiency and long, trouble-free engine life.

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Caracas, Venezuela Gloucester, Mass. Tulsa, Okla. New Orleans, La.

MIDDLE EAST

Iran Making Lubes

Need for imports eliminated as native technicians put small, new plant into operation; most process units idle

Dahl M. Duff

IRANIAN technicians have been able to bring into operation the small lubricating-oil plant which Anglo-Iranian Oil Co., Ltd., had completed at Abadan shortly before the company's properties were taken over by the government.

This was announced by the Iranian Government at Teheran which said that within 6 weeks Iran would no longer need imports of motor oil.

Though comprising but a small part of the vast Abadan refinery, the lubricating-oil plant is of considerable importance to the Iranians. Without its production, the Iranians have had to meet their lubricating-oil needs by expensive imports. Since the unit had not yet begun to run when the company was forced out of the country, lubricating oil was the only petroleum product which the Iranians failed to find in the refinery storage.

The unit, with a listed capacity of 20,000 tons a year, consisted of MEK dewaxing, furfural extraction, and clay contacting. It was designed by E. G. Badger & Sons. Anglo-Iranian had planned that the unit, the only lubricating-oil plant in the Middle East, would meet the domestic needs of Iran and nearby countries.

Iranian representatives are known to have approached the design engineers for assistance in bringing it into production. The difficulty was with two rotary filter drums which were reported to have cracked. Presumably these have now been repaired or replaced.

In announcing operation of the unit, the Iranian Government charged that the American and British "broke a key part" while trying to operate it. "The American firm which had built the unit did not cooperate with us to repair or change the broken part or even give us any information regarding operation of the unit," the government statement said.

Little activity.—Nearly all the other equipment in the refinery continues idle. The National Iranian Oil Co. is reported to be running one of the smaller distillation units at limited throughput as well as the small 2,500-bbl. daily capacity refinery at Kermamshah which serves some of the domestic requirements.

Anglo-Iranian left some 13,000,000 bbl. of products in storage when its staff was evacuated, and since there has been no success in selling the oil considering present high tanker rates, the only outlet is internal consumption in Iran amounting to 15,000 to 20,000 bbl. daily.

There is no sign of any weakening of the Mossadegh Government, despite the fact the regime is short of foreign exchange as a result of the loss of oil revenue. If anything, the government seems to be consolidating its position in the country. The only move in the nationalization dispute is the scheduled hearing next month by the International Court of Justice at The Hague.

Developments.—Last week in Teheran, the leader of the right-wing opposition to the Mossadegh regime, Jamal Imami, came out of hiding and surrendered to the government on a charge of illegal financial dealings. Imami who had led 14 other Majlis deputies in a fight against the government, was freed on bail.

The Iranian Government refused to renew the residence permit of the Teheran correspondent of the Times of London. The correspondent, Basil Bunting, left the country. He was the fifth newspaperman which the government has forced out of the country.

An old controversy echoed when the Iranian Government complained to Britain that it was illegally interferring in the affairs of Bahrein and other Persian Gulf islands which Iran claims. Iran said Britain was sending a legal adviser to study the status of the Persian Gulf shaikdoms. The Iranian claim to the islands is based on their capture by Persian subjects more than 300 years ago.

Loading Record Set

Trans-Arabian Pipe Line Co. has set a record of 1,081,000 bbl. for a single day's loading of crude oil at its Tapline terminal near Sidon.

It was made possible by the recent construction of a fifth submarine loading berth. This, added to the four existing berths, allowed the record total of crude to be placed aboard eight tankers.

The terminal is at Zahrani, 5 miles south of the Lebanese port city of Sidon. The terminal includes a total of 3,760,000 bbl. of storage, and a modern headquarters building is being erected.

The loading lines are supplied by three 30-in. lines from the tank farm. Theoretical maximum rate of the loading lines is 100,000 bbl. an hour but the tankers take considerable time maneuvering into place, coupling, and with other preparations.

Last year the 1,068-mile line from Arabian American Oil Co.'s fields in Saudi Arabia moved an average of 294,531 bbl. of crude per calendar day to Sidon. At the terminal average loading time per ship in 1951 was 7 hours and 57 minutes, and average loading rate per ship, 14,900 bbl. per hour.

Saudi Arabia Discontented

W. S. S. Rodgers, chairman of the board of The Texas Co., told Texaco stockholders in New York last week that, as a result of unrest generally in the Middle East and the renegotiation of certain concession contracts, several issues have arisen between Aramco and the Saudi Arabian Government.

Four nonofficer directors of Aramco spent several weeks in Saudi Arabia discussing these issues with the government, Rodgers said. The Aramco management is continuing these talks with the hope that mutually satisfactory conclusions will be reached.

The renegotiation of other contracts mentioned by Rodgers refers to the new 50-50 agreement in Kuwait and Iraq. Aramco made the first 50-50 agreement in the Middle East in December 1950. The Saudi Arabian Government apparently is now seeking to obtain some of the more favorable terms provided in the Iraqi agreement.

Israeli Concessions Sought

Negotiations for oil concessions in Israel have been undertaken by a Canadian organization identified as Continental Canadian Oil Co.

Frank Kaftel, head of the new company, said it was hoped to begin drilling in Israel before the end of the year. He made his statement in Paris on his way back to Canada from Israel where he had talks with various members of the government on obtaining concessions covering five areas.

The Israeli parliament is scheduled to begin consideration the latter part of May of an oil law authorizing concessions and prescribing terms.

Although provisions of the law have not been made public, it reportedly provides for cancellation of exploration licenses granted in 1940 by the British - Palestine Mandate Government to a subsidiary of Iraq Petro-

leum Co., Ltd. This old concession covered all of Israel except the concession area of the Palestine Potash Co. in the Dead Sea region.

I.P.C. was drilling in the southern part of the country in 1948 but left the rig when the Arab-Jewish war forced abandonment of the operation. Some geologists who have worked in what is now Israel take a somewhat less enthusiastic view of its prospects than that attributed to Max Ball, petroleum consultant who studied the country on behalf of the government about a year and a half ago.

Aramco Expands Facilities

Arabian American Oil Co. is building several new installations to facilitate the marketing of oil products in Saudi Arabia itself.

A marine terminal is being built in Jeddah which, with an existing bulk plant there, will serve the requirements of the western half of the country.

In Dhahran, a $400,000 bulk plant is under construction as a part of the program for Saudi Arabian oil distribution. A 4-in. products pipe line was recently laid to carry gasoline, diesel fuel, and kerosine to the new Dhahran plant.

Demand for oil products in Saudi Arabia, though still relatively small, is growing rapidly. In 1951, Aramco supplied 1,673,945 bbl. daily of products to local consumers. This is equivalent to about 4,600 bbl. daily.

Magwa Test Promising

S. A. Swensrud, president of Gulf Oil Corp., said at the company's annual meeting last week in Pittsburgh that a second well is nearing completion in the Magwa area of Kuwait. This second well, located about 2 miles east of the strike, "gives promise of confirming the importance of the new discovery."

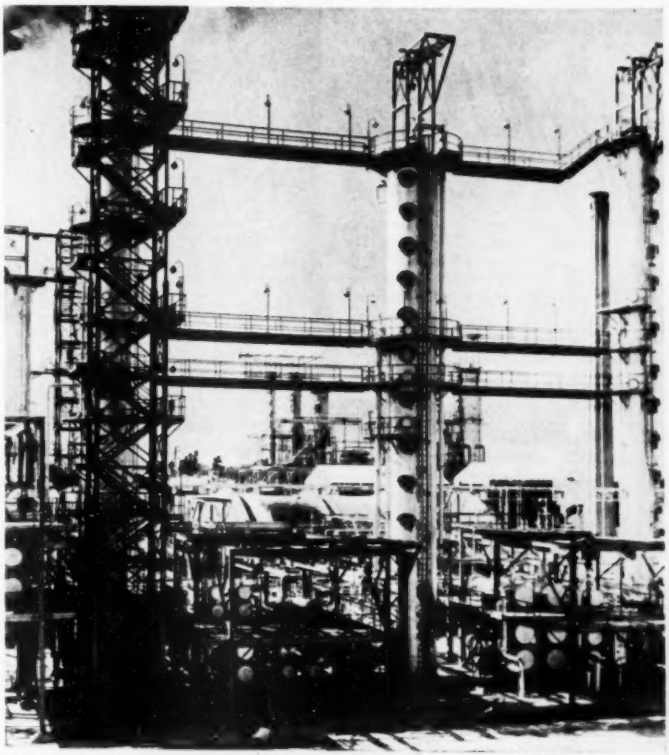
The original Magwa well, about 7 miles north of Burgan field, was tested last October. It indicated a substantial enlargement of this world's largest oil field, which is estimated already to have reserves of about 15 billion barrels.

Chemchemal Test Started

Iraq Petroleum Co., Ltd., has inaugurated a test well on the Chemchemal structure about 40 miles due east of Kirkuk field in northeastern Iraq.

A well was drilled in this area in 1929 and obtained some gas production.

At the ceremony marking commencement of new drilling, F. C. Ryland, I.P.C. fields official, explained how the company's new pipe lines had made it necessary to go outside Kirkuk field to insure that increasing supplies of Iraqi oil would always be available to fill the lines.



FRACTIONATING COLUMNS.—Part of the new reforming unit at the 60,000-bbl. Shell-Berre refinery.

Modern Refinery

Shell-Berre 60,000-bbl. plant, one of Europe's finest, nearing full operation; cat cracker to be finished soon

ONE of the most modern refineries in Europe is the rehabilitated and enlarged Shell-Berre plant at Berre l'Tang, near Marseilles, now nearing full operation.

The postwar reconstruction program has enlarged the crude throughput of this plant from half a million to three million tons a year, the equivalent of about 60,000 bbl. per day, and has added facilities for high-octane gasoline, liquefied petroleum gas, lube oils, and many specialty products. The official opening of the refinery was observed January 17, although the new fluid catalytic cracking unit will not be in operation for several months.

The refinery is operated by Cie. de Raffinage Shell-Berre, which was formed in 1947 by Shell Francaise (60 per cent) and Cie. des Produits Chimiques et Raffineries de Berre (40 per cent).

The latter concern had operated the Berre l'Etang refinery since 1931 and Shell Francaise had the refineries at Petit Couronne (Rouen) and Pauillac (Bordeaux), both badly damaged during World War II. In 1951 the throughput of the three refineries exceeded four million tons (about 80,000 bbl. daily), or about one quarter of the total French refining capacity.

Facilities.—The rebuilt Berre plant now has a new topping unit with a capacity of 1,200 tons (about 8,000 bbl.) per day, which has been operating since 1951. It has six fractionating towers, one of which, weighing 300 tons, is among the largest in Europe.

The fluid catalytic cracking unit, which will be in operation before the

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Cameron "FLEX-SEAL"

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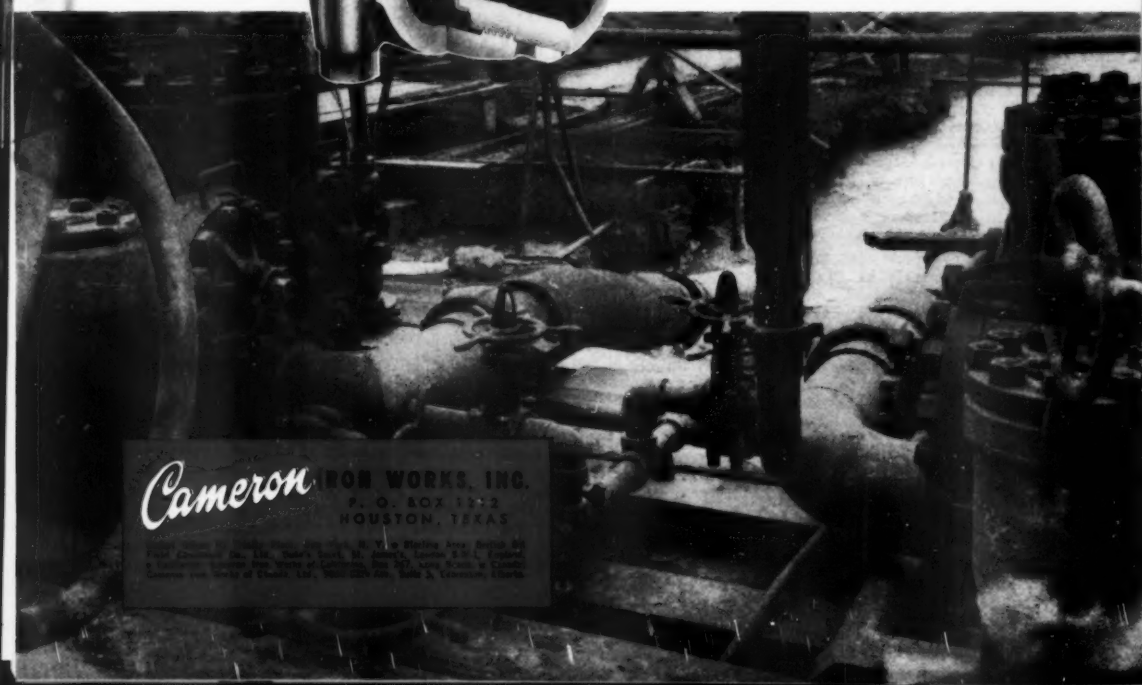
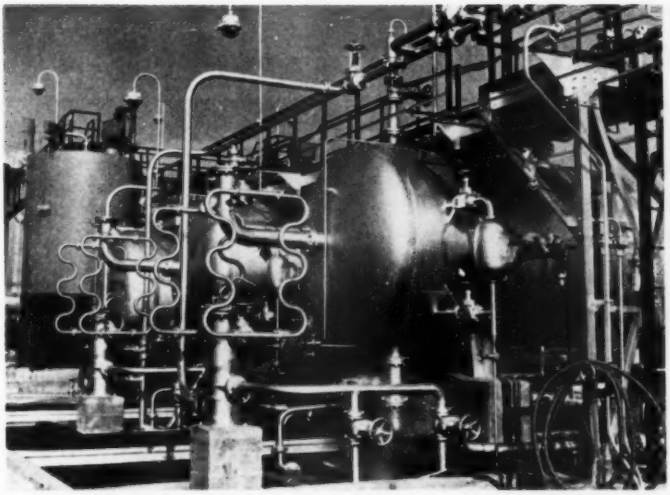
SELLING THROUGH SUPPLY STORES





BUTYLENE TREATER.—Sulfurous impurities are removed from gas in this unit of the expanded Shell Berre refinery near Marseilles.

end of this year, is of the same basic design as those in Shell's Pernis refinery near Rotterdam and the Stanlow refinery in England. It will supplement the Houdry fixed-bed cracker which was ready for erection in 1940 but was not put into operation until after the war. The fluid plant will better handle the high-sulfur crudes which form the bulk of Berre's throughput.

The refinery also includes a high-vacuum distillation unit, a smaller topping plant, an acid treating plant for lube oils, a reforming unit, a lube-oil blending plant, paraffin-wax plant, treater for special white products, asphalt plant, and an L.P.G. plant. Auxiliary facilities, generating capacity, and storage capacity also have been enlarged.

Output of the refinery is approximately 30 per cent heavy fuel oil, 20 per cent automotive gasoline, 11 per cent gas oil, 10 per cent light fuel oil, 5 per cent asphalt, 2 per cent aviation gasoline, 2 per cent kerosine, and the remainder lube oil, wax, butane, propane, special solvents, and miscellaneous products.

Supply data.—The refinery operates chiefly on Kuwait crude, but handles some from Venezuela, Colombia, Iraq, Algeria, and other sources. A 14-in. pipe line along the east shore of Lake Berre connects the refinery with the new oil port of Lavera 25 miles away. This port, build since the war by the Marseilles Chamber of Commerce, can accommodate large ocean tankers and serves all three Lake Berre refineries: Shell-Berre, La Mede (Cie. Francaise des Petroles), and Lavera (Societe des Huiles de Petrole, B.P.).

The refinery is well located for the receipt of crude and for the distribution of products, being at tidewater and on the Marseilles-Paris railroad. Its tank-car loading racks have been enlarged to handle a million tons a year, and coastal tankers are loaded with products at a terminal in Lake Berre. Butane and propane are piped 2½ miles to the Rognac Depot of Societe pour d'Utilisation Rationelle des Gas (U.R.G.), which has an L.P.G.-bottling capacity of 40,000 tons per year, the largest plant of its kind in the world.

LATIN AMERICA

Bleak Outlook

Bolivian revolution makes oil-capital entry unlikely

THE recent Bolivian revolution and overthrow of the existing government makes even more remote the participation of private foreign capital in development of the country's oil resources.

The party now in power is dominated by a labor group which has already announced plans for nationalization of the tin mines, the country's major industry. It is not likely that the party will permit the entry of private foreign oil capital—even more unlikely that the oil companies would be willing to invest under such conditions.

New oil ministry.—One of the first steps of the new M.N.R. Government was the creation of a Ministry of Mines and Petroleum. It is headed by Juan Lechin, the leader of the miners union and the main advocate of the program of tin nationalization.

The previous regime in Bolivia had been attempting to induce foreign oil capital to explore in certain designated areas. These efforts failed to bring in any of the major operators. Besides the unsettled political conditions and the existence of a government oil organization, Bolovia is at a geographical disadvantage for marketing large volumes of oil in the export trade.

The Export-Import Bank has loaned a total of $8,500,000 to the Bolivian agency, Y.P.F.B., to build two refineries and a pipe line. The present production of less than 2,000 bbl. daily is insufficient for these facilities, and the Bolivians have asked an additional $3,000,000 to develop the fields. This has not yet been granted.

Ultramar Terms Revealed

The Argentine Government has announced in Buenos Aires that it paid out 75,000,000 pesos—equivalent to about $5,450,000—in its purchase last month of the properties of Ultramar S.A. Petrolea Argentina.

The company, jointly owned by The Texas Co. and Socony-Vacuum Oil Co., Inc., operated a 6,000-bbl. daily refinery, mostly for lubes, at Buenos Aires and had terminal and distribution facilities. It discontinued its business and sold out to the government in a transaction which reflected the difficulties encountered by foreign companies in Argentina.

At the time the sale was made, it was reported that the Argentine Government paid a total of 125,000,000 pesos for Ultramar. This is the equivalent of about $9,000,000 *(The Oil and Gas Journal, March 31, page 75)*.

The two major companies still in Argentina are Shell and Standard-Oil Co. (N.J.). In its recent annual report Jersey Standard noted its Argentine affiliates are still seeking a long-term agreement with the government but that there had been no permanent solution to the question of whether the companies will be allowed to import the crude and products they need to regain their sales volume.

Tetuan Topping Plant

Texas Petroleum Co. is planning the construction of a small field topping plant at its Tetuan property (Tolima) in the upper Magdalena Valley of Columbia.

The plant will have a capacity of about 1,000 bbl. daily and will be used principally to flow the wells and test the structure. The company now has five producing wells with a total potential of about 3,000 bbl. daily of 23° and 28°-gravity crude.

Although the plant is primarily a field installation, its production will be of some benefit in relieving the products-supply situation in the area.

Another development using

B. F. Goodrich Chemical Company *raw materials*

The tubing hanger is manufactured by Beaumont Iron Works Co., Beaumont, Texas. Hycar sealing member is produced by Murray Rubber Co., Houston, Texas. B. F. Goodrich Chemical Company supplies the Hycar rubber only.

Tubing hanger that takes the pressure!

WHEN this tubing hanger goes to work, it helps drillers in important ways—makes savings, too. And Hycar helps do the job—as the rubber member of the hanger. It provides a pressure-tight surface seal that protects against blowouts.

Doubly important is Hycar's ability to withstand the deteriorating effects of oil and gas under high pressure. This Hycar seal will last indefinitely—will stay on the job for the life of the well!

Saving time, work and money like this is nothing new for Hycar rubber. It is used in many petroleum applications—in ways where resistance to heat and cold, weather and wear, abrasive mud, gas, oil and many chemicals is often vital.

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It will produce gasoline, kerosine, diesel, and fuel oil.

Motor fuel is now being imported to supply Medellin, and some of this will be made unnecessary through operation of the topping plant.

Plant Expansion Studied

Five representatives of Foster Wheeler Corp. have arrived in Colombia in connection with the government's project to modernize and expand the refinery at Barrancabermeja.

The plant will be enlarged to 35,000 bbl. daily, and catalytic cracking facilities installed.

The work is being financed in part by a loan from International Petroleum Co. of Colombia which operates the plant under lease from the Colombian Government oil organization.

FAR EAST

1951 Production Revealed

Production in Indonesia in 1951 of Standard - Vacuum Oil Co. and Bataafsche Petroleum Mij. (Royal Dutch-Shell) was 3,300,000 metric tons (about 66,000 bbl. daily) and 4,200,000 metric tons (about 84,000 bbl. daily), respectively.

According to a report of the Indonesian Information Service, the combined payroll of the two companies amounted to 398,000,000 rupiahs, the equivalent of about $36,000,000.

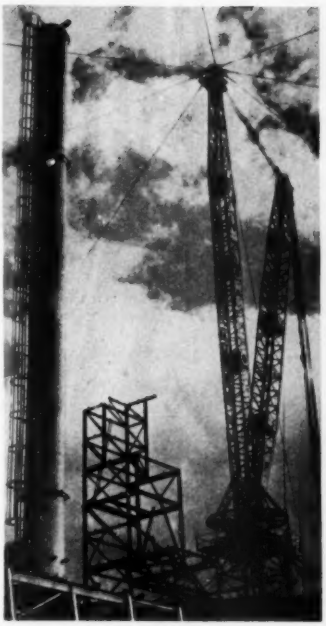
The labor force of the two oil companies numbered nearly 40,000 of whom 1,570 were foreigners. The companies contributed 81,000,000 rupiahs (about $7,300,000) to export and statistical duties.

Standard-Vacuum and Shell have been the only two producing companies in Indonesia if the joint western New Guinea operation is excepted. However, Caltex is scheduled to begin commercial production of Minas field in the near future.

India Getting More Avgas

Another sign of the lessening effect of the loss of the Abadan refinery capacity on world supplies was apparent in the action of the Indian Government in lifting restrictions on the consumption of aviation fuel.

The government imposed a 30 per cent cut on domestic consumption of avgas last July after the shutdown at Abadan. With supplies improving, the restrictions were partially relaxed in November, and the government's latest decision follows successful efforts by the oil-marketing companies to bring into India sufficient supplies from other sources. Abadan was the major Eastern Hemisphere producer of aviation fuel, but the deficit in this product has been overcome largely by shipments from the United States.



Progress at Kent

Construction of Anglo-Iranian Oil Co.'s brand new Kent refinery in England, the largest project currently under way outside the United States, is going rapidly ahead. Shown here is status of the work on the catalytic cracking unit. In the left foreground, the furnace is nearing completion. Center background shows the partly erected steelwork of the main structure for the reactor and regenerator. The plant will begin limited operations this summer and reach its full 84,000-bbl. daily capacity by the end of the year.

Oil and Shipping

Each pays billion yearly for services of the other

THE world-wide petroleum and shipping industries are mutual customers to the extent of about a billion dollars annually on each side, according to Richard G. Coffin, marine-sales department manager for Socony-Vacuum Oil Co., Inc.

In 1915, the shipping industry bought approximately 306,000,000 bbl. of bunker and diesel fuel for which it paid about $925,000,000 or the equivalent in other currency. In addition, shipping used about 1,400,000 bbl. of lubricants estimated to cost another $42,000,000.

Against this total $967,000,000 bill, Coffin estimated the petroleum industry spent more than $1,000,000,000 for freight and charter hire with the shipping companies. For freight, he said, Socony-Vacuum last year paid shipping companies more than $17,000,000 for cargo space and estimated the industry total would be about $250,000,000.

For charter hire of tankers, Socony-Vacuum alone paid more than $35,000,000 last year. Coffin pointed out that of the total world tanker fleet of 18,210,287 tons, about 10,000,000 tons is not oil-company owned and is available for charter. The net dollars, or equivalent currency, left with the shipping industry by the petroleum industry for the use of this tonnage probably amounted to $800,000,000, he said.

Bunker supply improved. — Coffin made these remarks during a talk before members of the Propeller Club in Genoa, Italy. On the subject of future supply of bunker fuel, he said, the outlook now has improved somewhat. The most important single factor in this improvement has been the combination of a mild winter and the increased coal output in Europe.

"Now that we have entered the slackened spring consuming season, we expect fewer difficulties in the heavy-oil supply before autumn—barring a new emergency or large-scale refinery shutdown," he said. "Our chief aim during spring and summer will be to build up depleted world-wide inventories for next winter when supplies again may become tight if the Abadan refinery is still shut down."

Discussing the European oil situation, Coffin said that the gains made in refining capacity in Europe have actually offset much of the loss incurred through the closing of Abadan. Today, he said, Europe's refineries have a crude capacity of 2,442,970 bbl. daily and 625,210 bbl. daily of cracking capacity. These figures include estimates of the capacities of plants in Russia and Communist Eastern Europe. By comparison the total at the end of 1940 was 1,366,965 bbl. daily crude and 383,370 bbl. daily cracking.

Sun Not Going Abroad

The extra hazards involved in foreign operations were recognized by Joseph N. Pew, Sun Oil Co. chairman, when he said at the company's recent stockholders meeting that Sun has no intention of attempting to develop production abroad.

Obviously referring to such situations as that in Iran, Pew called attention to the "extraordinary risks" in foreign operations. He said the "margin per barrel is better at home than anywhere else."

Sun's only interests outside the United States are in Canada, which the industry generally considers on the same basis as a strictly domestic operation.

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nipple up faster, easier
eliminate open hole hazards
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PERSONALS

Vice President

W. C. Whaley has spent 4 decades in oil industry

WILLIAM C. WHALEY, vice president of Sunray Oil Corp. in charge of all field operations, took his first job in the San Joaquin Valley oil fields in 1910 while still attending school and has been in the oil industry ever since.

In 1911 he took his first full time job with Commercial Oil Co. in Coalinga, Calif., as a roustabout. The next year he joined Honolulu Oil Co., and from 1915 to 1924, with the exception of 2 years spent in the United States Army overseas, Whaley worked for various oil companies in California, Wyoming, Oklahoma, Texas, Montana, Kentucky, and the British West Indies.

In 1924 he joined the former Barnsdall Oil Co. as a driller, became vice president of the firm in 1931, was named a director in 1940, and was made general manager of the company's California operations in 1941. In 1950 when Barnsdall merged into Sunray, Whaley became a Sunray director and vice president.

Last month he was transferred from Los Angeles to Tulsa where he became a member of the firm's executive committee and chairman of the operating committee. In this new position he will generally supervise all field operations in both the Mid-Continent and California divisions.

Whaley is a member of the board of directors of the American Petroleum Institute, the Oil Producers Agency of California, the Western Oil and Gas Association, the Independent Petroleum Association of America, and the San Joaquin Valley Oil Producers Association, among other trade groups.

Vincent M. Norwood has been appointed manager of the Froomfield, Ont., refinery of Canadian Oil Cos., Ltd. Born at Sarnia, Norwood graduated from the University of Toronto in 1935 and joined the company in 1936, becoming first engineer at its Petrolia plant in 1941, plant superintendent in 1943, and general superintendent in 1950.

F. W. Borden, formerly general production superintendent for Sunray Oil Corp. in the company's field headquarters at Newhall, Calif., has been promoted to West Coast general superintendent and transferred to the division offices in Los Angeles. **L. M. Combs** is the new production superintendent in the Newhall district.

Reginald W. Ragland and **Stender Sweeney** have been elected vice presidents of Richfield Oil Corp. Ragland, assistant to the president, joined Richfield in 1937. Sweeney, personnel director for Richfield since 1941, has been associated with the company continuously since 1928, serving as petroleum engineer, drilling foreman, and division superintendent of production operations.

David W. Harris president of Universal Oil Products Co., Chicago, will deliver the address at the sixty-ninth commencement exercises of Georgia Institute of Technology June 9. Harris was graduated from Georgia Tech in 1912 with an engineering degree. In 1913 he was made director of the budget of Cities Service Co. Successively he became treasurer of Empire Gas & Fuel Co., vice president of Indian Territory Illuminating Oil Co., vice president and general manager of Arkansas Natural Gas Corp., vice president of Cities Service Defense Corp., and president of Arkansas Natural Gas Corp. and all of its subsidiaries.

Charles M. Roberts, field drilling and production superintendent for Union Production Co., has been transferred from Shreveport to New Orleans in a similar capacity. Roberts has been with the firm since 1931.

Walter H. Ritterbusch, Tulsa, has resigned as manager of the land and geological department of Kewanee Oil Co. to become an independent oil producer. His first oil job in the Mid-Continent region was construction of the Sand Springs refinery of the Waters-Pierce Oil Co. back in 1913. Prior to joining Kewanee in 1935 he worked for the old Gypsy Oil Co. and Phillips Petroleum Co.

J. S. LEACH

John Sayles Leach, executive vice president of The Texas Co., New York, has been elected president of the firm succeeding **Col. Henry T. Klein,** who resigned. Klein was elected chairman of the executive committee, a newly created post. Leach, who joined the firm in 1916 as a bookkeeper, was named assistant superintendent of the Dallas district in 1924, and after several other promotions he was named vice president in 1938, with headquarters in Houston. He became a director in 1949 and was elected executive vice president in 1950.

Joseph Rudolph has opened offices at Houston as a consultant and will practice in petroleum, mining geology, and engineering.

Dr. Sherman A. Wengerd, associate professor of geology at the University of New Mexico, has been appointed editor of the Four Corners Geologic Symposium to be published in the late summer or early fall of 1952.

Millard F. Westfall, formerly district engineer for Cities Service Oil Co. at Graham, Tex., has joined Husky Oil Co. at Cody, Wyo., as production engineer.

Herbert R. Hansen has joined Lawton Oil Corp. as chief of the purchasing division. He was formerly assistant director of the materials division for the Petroleum Administration for Defense. Before joining PAD he had been chief purchasing agent of Superior Oil Co.

Horace N. Goodell has resigned as chief geologist of the Rocky Mountain division of Union Oil Co. of California to become chief geologist for Cyprus Oil Co. at Los Angeles. **L. C. Decius,** formerly chief geologist of Tide Water Associated Oil Co. at San Francisco, is vice president of Cyprus.

Charles E. Bennett, president of Manufacturers Light & Heat Co., Pittsburgh, and vice president of the American Gas Association, has been elected president of A.G.A. by the executive board. He succeeds the late George F. Mitchell, former president of Peoples Gas Co., Chicago,

PERSONALS

who died March 26. At the same time **Frank C. Smith,** president of Houston Natural Gas Corp., was elected vice president of A.G.A.

George P. Moncrief has been appointed assistant production field superintendent at Premont, Tex., for Sun Oil Co. He was formerly district engineer at Midland, Tex. **H. T. Teel** has been transferred from Premont to Victoria, Tex., and promoted to foreman.

Frederick A. Myers has been appointed gas advisor to the chief of the gas supply and disposition branch in the Pittsburgh office of Gulf Oil Corp.

E. H. Leeman has been appointed area reservoir engineer for Shell Oil Co. in New Orleans. **L. P. Layman** has been promoted from Shell's area office in New Orleans to Franklin, La., as division exploitation engineer. **John F. Dillard** has been transferred from New Orleans to Donaldsonville, La., as division mechanical engineer.

Sybrand J. Veenstra has been appointed a vice president of Asiatic Petroleum Corp. Veenstra joined Bataafsche Petroleum Mij. at The Hague in 1928 having graduated as a mechanical engineer from the University of Delft, Holland. From 1930 to 1939 he was assigned to a variety of technical jobs in The Hague. In 1939 he left the Netherland East Indies to join the New York staff of Asiatic Petroleum Corp., and from 1944 until his recent appointment he was successively head of the priority division, assistant manager of the material department, and then manager.

Raymond E. Ming, South Texas district geologist for Stanolind Oil & Gas Co., at San Antonio, has resigned and joined the staff of David L. Gordon and W. C. Hildebrand, Jr., and Associates, at Houston. Ming will be petroleum geologist in charge of all exploration and production activities for this firm.

A. J. Solari has been appointed to the newly established position of senior staff geologist in Standard Oil Co. of California's exploration department. Others appointed to newly created positions include: **Karl Arleth,** senior staff geologist, development; **L. A. Tarbet,** area exploration supervisor, north coastal area; and **D. D. Hastings,** area exploration supervisor, Sacramento Valley area.

Successful Team Celebrates Anniversary

Four necessary "partners" in drilling the first discovery well in the Williston basin are shown here with North Dakota's Gov. Norman Brunsdale, center, as they met recently at Williston, N. D., at the anniversary celebration held on the first birthday of the discovery of oil. Left to right are Bob Wire, president of Loffland Brothers, contracting company which drilled the discovery well for Amerada Petroleum Corp.; A. Jacobsen, president of Amerada; Clarence Iverson, on whose land the well was drilled; and T. P. Tarwater, general division manager of Mid-Continent Supply Co., which supplied equipment for the drilling operation.

Murphy Walker has been named district geologist for La Gloria Corp. at Corpus Christi. Walker has been with the company 4 years.

H. W. Volk, Jr., has resigned as geologist for **George W. Graham,** independent oil man, to take charge of South Texas exploration and development for Northern Pump Co. and Northern Ordnance Co. of Minneapolis.

L. V. Nugent, who has been in the oil and gas business 29 years, has been appointed field superintendent for Kirkpatrick & McGuire, Shreveport consulting petroleum engineers. He will maintain headquarters at Chanute, Kans., where the firm is engaged in water-flood projects.

Oscar W. Morton has been appointed director of the gas-operations division of the Petroleum Administration for Defense, and **G. Barrett Herr** has been appointed director of the gas-facilities division. Morton succeeds **A. Dale Greene,** who is returning to United Gas Pipe Line Co., and Herr succeeds **Louis C. Sonnen,** who is returning to his job as vice president in charge of purchases for Tennessee Gas Transmission Co.

J. W. Mendenhall, formerly manager of the land division of Atlantic Refining Co., has been appointed general manager of domestic crude-oil production. **Carle F. Sharpe** will succeed Mendenhall as manager. **W. Dow Hamm** has been appointed general manager of exploration which includes both domestic and foreign operations, and **Edgar Kraus,** chief geologist, moves up to manager of domestic exploration. Mendenhall has been with the firm since 1919, Sharp since 1936, Hamm since 1942, and Kraus since 1921.

Sam Rogers, formerly with Rogers-Ray, Inc., has formed Rogers Geophysical Co. at Houston.

E. B. Priebe has been appointed secretary-treasurer of Bay Petroleum Corp. He was formerly with Skelly Oil Co. for 18 years.

W. T. Harland, engineer for Stanolind Oil & Gas Co., has been transferred from Corpus Christi to Beeville, Tex.

E. L. Saugee, former geologist with Phillips Petroleum Co. at Denver, has joined Roden, Darden, and McRae, independent operators at Denver.

W. V. Cropper has been promoted to assistant chief chemist of Standard Oil Co. (Ind.), at the company's Whiting, Ind., research laboratories.

Thomas C. Hiestand has resigned as staff geologist with Cities Service Oil Co. to become associated with an operating unit composed of **F. Kirk Johnson** and Brooks-Scanlon, Inc., Hiestand will establish offices in Denver and will direct operations in the Rocky Mountain area.

W. G. Olsen, formerly division geologist at Casper, Wyo., for Continental Oil Co., has resigned to open Rocky Mountain division offices in Casper for Houston Oil Co.

PERSONALS

Louis B. Wells, manager of Sun Oil Co. refineries, and **Willard W. Wright,** general sales manager of the company, have been elected to the board of directors.

Charles E. Shaw, employer representative, and **Ward H. Donahoe,** adviser to the United States delegation, both of Standard Oil Co. (N. J.), are in Rio de Janeiro for the fifth regional conference of American State members of the International Labor Organization, the first to be held since 1949.

D. V. Kipley and **Paul Stewart** are new assistant district production superintendents for Ohio Oil Co. in the Permian basin district, which has its headquarters in Midland, Tex. Kipley, who recently returned from military service, was a petroleum engineer for Ohio in the Midland district office before he took his last service leave. Stewart came to Midland from Hobbs, N. M., where he had been a production supervisor for the company.

J. Ralph Vannoy, assistant head of the maintenance and construction department in charge of the crafts division for Esso Standard Oil Co., has been appointed head of the department succeeding the late Ernest Butterworth. **Henry T. Wicker,** former division engineer on special assignment, succeeds Vannoy as assistant of the department. Vannoy, who has been with the firm 18 years, started as a chemist in the refinery laboratory. Wicker has been with the firm 24 years.

E. A. Sauer is currently opening Rocky Mountain district offices for Canada Southern Oils, Ltd., at Casper, Wyo. **Jim Carleton, Jr.,** will be district geologist for the firm, and **James Ballard,** formerly with Tide Water Oil Co. in Houston, will be liaison geologist. **C. E. Manion,** Denver consulting geologist, has been retained by the company for Rocky Mountain operations.

James A. Graves has been appointed vice president of Gillring Oil Co. in charge of exploration, production, and development in Agua Dulce field, Nueces County, Texas. A graduate of the University of Texas, Graves joined Phillips Petroleum Co. in 1940, resigning in 1948 to become associated with Magnolia Petroleum Co. as district engineer at Alice, Tex. He left Magnolia in 1951 and joined Gillring. **L. C. Smith** has been elected vice president of the firm and will be in charge of natural gasoline and processing with headquarters at Gillring's Banquete, Tex., plant. Smith joined the firm in 1948 and has served as assistant superintendent, superintendent, and manager.

Experts Discuss Exploration, Production Methods

Leading technical men of Standard Oil Co. (N. J.) affiliates met in Tulsa for 2 days last week to discuss improved production and exploration methods as means of increasing reserves. Five of the group shown here are, left to right, I. H. Hughes, chief geologist of International Petroleum Co., Bogota, Colombia; Dr. P. S. Williams, chief of research, Carter Oil Co., Tulsa; H. F. Moses, vice president in charge of exploration and research, Carter, Tulsa; E. V. Murphree, president of Standard Oil Development Co., New York; and V. Taylor, of Imperial Oil, Ltd., Calgary, Canada. Others attending the meeting were: R. W. Beck, A. J. Freie, W. M. Glendenning, G. R. Heyle, S. Vasquez, all of Creole Petroleum Corp.; G. E. Cannon, M. F. Fincke, H. N. Fisk, T. J. Fuson, D. H. Gardner, K. O. Heintz, T. A. Huber, P. H. Masson, A. L. Pierson, V. L. Redding, R. E. Taylor, M. E. True, H. D. Wilde, Milton Williams, all of Humble Oil & Refining Co.; W. A. Bain, Dr. Pierre Cote, W. J. Gibson, R. A. Hemstock, R. D. Knowles, Frank Spragins, J. W. Young, Imperial Oil, Limited; E. D. Ackerman, A. G. Fischer, J. M. Marsh, W. J. Nutt, all of International Petroleum Co.; G. M. Knebel, I. S. Salnikov, P. M. Tucker, of Standard Oil Co. (N. J.); A. P. Bryan, H. M. Hoberg, T. V. Moore, E. D. Reeves, P. J. Whelan, of Standard Oil Development Co.; E. W. Berlin, D. E. Davis, N. B. Sauve, of Standard Vacuum Oil Co.; R. N. Meinert, W. A. Bruce, E. M. McNutt, F. G. Boucher, P. A. Dickey, M. W. Kriegel, R. R. Thompson, P. W. Whitaker, K. H. Andresen, C. D. Russell, C. B. Scott, J. E. Eckel, J. F. Bayhi, J. J. Roark and J. F. Rominger, all of Carter Oil Co.

DEATHS

Ernest L. Blanck, president of B. & M. Oil Co., operating oil properties in the Maricopa area of Kern County, California, died April 16 at Los Angeles.

Thomas F. Harvey, 70, pioneer oil man, died April 20 at Bonham, Tex. Prior to his retirement 15 years ago he had been with the old Cosden Oil Co. and Mid-Continent Petroleum Corp.

William A. Spurgin, 33, of Shell Oil Co., died April 12 in Los Angeles.

Joseph Cleveland Bacon, 70, retired lease broker, died April 10 at Los Angeles.

Charles H. Bell, 79, veteran oil producer and drilling contractor, died recently in Logan, Ohio. Bell spent his entire business career in the oil business and had interests in Ohio, Michigan, Kansas, Oklahoma, and Texas.

Frank Perry, 83, driller, died April 10 at Los Angeles.

Mrs. Kathleen McBride Kelley, president of W. C. McBride, Inc., active oil and gas producing firm of St. Louis, died April 20.

Harry C. Fredericks, 57, retired chief accountant of the marine department of Atlantic Refining Co., died April 16 in Philadelphia.

Richard G. McLeod, 67, comptroller for General Petroleum Corp. for the past 25 years, died April 14 in Long Beach, Calif.

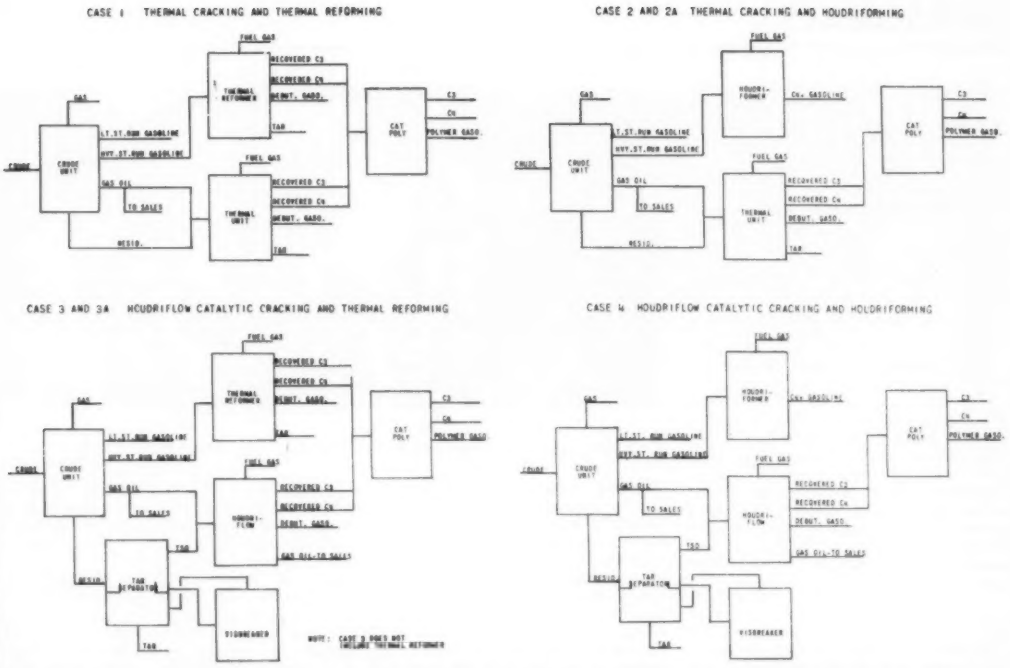


Fig. 1—Flow arrangement for four alternate operations involving thermal and catalytic cracking and reforming.

Houdriforming's Role in Petroleum Refining

by T. A. Burtis* and H. D. Noll*

This discussion shows how Houdriforming is applied to:

1. Upgrading low-octane heavy naphtha for incorporation in motor fuels.
2. Practically complete desulfurization and octane improvement of high sulfur stocks.
3. Processing of selected cuts for aromatics and/or high rich rating blending fuels.

GASOLINE octane levels are continuing to move upward in response to the higher and higher compression ratios automobile manufacturers are incorporating in their engine designs. Tetraethyl lead supplies are becoming a little less limited, although still restricted. For many refineries, those who have installed catalytic cracking as well as those who have not, the uptrend in octanes will mean that straightrun naphthas must be upgraded. In fact, most refineries are operating at the very least, thermal reforming equipment.

Houdriforming,[1] a catalytic reforming process, has been introduced as an optimum method, as of at present, for improving the octane rating of naphthas, while at the same time, maximizing salable liquid products. Benefits from this process are not limited to raising the level of octanes and obtaining the maximum octane barrels but also include very considerable aromatics production and very effective sulfur removal. Another advantageous application of Houdriforming is for upgrading natural gasoline or condensate, which at current octane levels have presented a disposal problem to the producers.

*Houdry Process Corp., Philadelphia. Presented at annual meeting of Western Petroleum Refiners Association, San Antonio, April 1952.

Economic Study

A true picture of utilization of catalytic reforming in modern refineries should only be based upon an overall refinery yield and economic study with crude oil charged to the refinery and finished products sold from the refinery. To be realistic, this refinery should contain cracking equipment, either thermal or catalytic; reforming equipment, also either thermal or catalytic; and catalytic polymerization. An earlier paper[2] discussed application of Houdriflow catalytic cracking to a 10,000-bbl. per calendar day refinery, thereby illustrating various combinations of feed preparation and cracking. Again the starting point for an economic survey is a 10,000-bbl. per calendar day refinery. However, the principal variable studied here is reforming. The yield and economic study presented here considers various methods for processing 10,000 bbl. per calendar day of East Texas crude with production of gasoline and other products to arrive at the most profitable methods.

Ultimate products of the refinery include premium and motor gasolines (10 lb. R.v.p.), virgin middle distillate, and heavy fuel. Of the total gasoline, 25 per cent is to be premium grade meeting 92 research oc-

TABLE 1—CRACKING YIELDS

Charge:	Thermal B.P.C.D.	Houdriflow B.P.C.D.
Distillate	960	960
Residuum	4,000	4,000
Total	4,960	4,960
Products:		
C_3 & lighter (F.O.E.)	454	444
C_4	290	663
C_5+ gasoline	2,155	2,510
Fuel oil	2,318	1,574
Yields applied to cases	1, 2, 2A	3, 3A, 4, 4A

Note: Houdriflow feed preparation consisted of tar separation followed by visbreaking of tar separator bottoms. Houdriflow fresh reactor charge actually 4,272 bbl. per calendar day.

TABLE 2—REFORMING YIELDS

	Thermal		Houdriforming		
	Case 1	Case 3A	Case 2 & Case 4	Case 2A	Case 4A
C_3 and lighter, wt. %	15.0	8.0	4.3	6.3	2.9
C_4, vol. %	9.1	5.9	4.0	6.8	2.5
C_5+ gasoline, vol. %	73.6	85.0	90.0	86.0	93.0
Polymer, vol. %	3.0	2.0			

Charge to all cases: 1,990 bbl. per calendar day of 250°-400° F. naphtha.

TABLE 3—YIELDS AND OCTANES

Case	Total gasoline yield*	Research octane + 2cc. TEL/gal.	Research octane + 3cc. TEL/gal.
1	63.7	85.5	87.2
2	66.4	86.6	88.4
2A	65.0	87.9	89.6
3	72.8	84.8	86.7
3A	69.6	87.9	89.4
4	70.0	91.1	92.4
4A	70.7	90	91.4

*Vol. per cent of crude.

tane (F-1) while 75 per cent is motor grade, 86 research octane. In cases where the refinery is vapor-pressure deficient it is assumed that normal butane, which is readily available, will be purchased.

Thermal cracking, Houdriflow catalytic cracking, thermal reforming and Houdriforming yields are presented hereafter (Tables 1 and 2) based upon Houdry laboratory evaluations of East Texas crude oil. Gasoline and fuel blends from pilot-plant operations were prepared and tested.

In the cases presented for economic comparisons, the crude oil is fractionated in a conventional manner with a 250° F. end-point straightrun gasoline, 250°-400° F. reforming naphtha, a light cut (400°-600° F.) for middle distillate uses, and a 40 per cent volume residuum. The straightrun gasoline is used directly in final motor-gasoline blends in all cases. The 250°-400° F. naphtha is reformed either thermally or by Houdriforming. Of the distillate oil, 1,000 bbl. per calendar day are assumed as sold with the remaining 960 bbl. available as cracking stock. The residuum, 40 per cent on crude, is processed by cracking. Catalytic polymerization is utilized to the extent of the recovered olefins available in the C_3 and C_4 fractions.

Two basic refineries have been considered, one with thermal cracking, the other with Houdriflow recycle catalytic cracking. To each refinery is added reforming, either thermal or Houdriforming. Block flow diagrams of the four alternatives are given as Fig. 1. For the two Houdriformer installations, operations at each of two severity levels are considered.

Seven cases are presented in Table 3. In brief resume they are:

Case 1—Thermal cracking, thermal

TABLE 4—ECONOMIC SUMMARY—10,000 BBL. PER CALENDAR DAY REFINERY CHARGING EAST TEXAS CRUDE

Processing—		Case 1 Thermal cracking and reforming		Case 2 Thermal cracking, Houdriforming		Case 2A Same as Case 2 except more severe Houdriform		Case 3 Recycle Houdriflow catalytic cracking, no reforming		Case 3A Recycle Houdriflow catalytic cracking, thermal reform		Case 4 Recycle Houdriflow Houdriform (Same as Case 2)		Case 4A Same as Case 4 except less severity of Houdriforming	
	$/bbl.	BPCD	$/CD	BPCD	$/CD	BPCD	$/CD	BPCD	$/CD	BPCD	$/CD	BPCD	$/CD	BPCD	$/CD
Credit:															
Premium gaso.	5.04	993	5,005	1,661	8,371	1,626	8,159	750	3,780	1,741	8,774	1,750	8,820	1,769	8,916
Motor gasoline	4.62	5,376	24,837	4,983	23,021	4,878	22,536	6,526	30,150	5,223	24,130	5,250	24,255	5,305	24,509
Straightrun gas oil	3.36	1,000	3,360	1,000	3,360	1,000	3,360	1,000	3,360	1,000	3,360	1,000	3,360	1,000	3,360
Fuel oil	1.75	2,378	4,162	2,318	4,057	2,318	4,057	1,574	2,755	1,614	2,825	1,574	2,755	1,574	2,755
Fuel gas (F.O.E.)	0.84	717	602	541	454	580	487	405	340	582	489	547	459	490	412
Total			37,966		39,263		38,635		40,385		39,578		39,649		39,952
Debit:															
Crude oil (2.65 + .25)	2.90	10,000	29,000	10,000	29,000	10,000	29,000	10,000	29,000	10,000	29,000	10,000	29,000	10,000	29,000
n-Butane	2.10	239	502	302	634	187	393	70	147						
TEL	0.231c/cc.		1,854		1,595		1,120		2,118		1,216		458		721
			31,356		31,229		30,513		31,265		30,216		29,458		29,721
Net revenue			6,610		8,034		8,122		9,120		9,362		10,191		10,231
Operating costs:															
Operating labor and supervision			378		445		445		378		445		513		513
Operating utility			1,034		907		919		877		1,047		940		940
Chem. & supplies			154		137		137		141		140		139		139
Catalyst:															
Cat poly			39		22		22		43		57		43		43
Houdriformer					100		159						100		100
Houdriflow									260		260		260		260
Royalty:															
Cat poly			55		31		31		60		75		60		60
Houdriformer					60		60						60		60
Houdriflow									128		128		128		128
Maintenance			559		585		585		609		636		666		666
Office, laboratory, other overhead			206		206		206		206		206		206		206
Ins., interest, taxes			308		373		373		431		494		562		562
Total costs			2,733		2,866		2,937		3,133		3,488		3,677		3,677
Profit before depreciation & tax, $/CD			3,877		5,168		5,185		5,987		5,874		6,514		6,554
Investment			$2,250,000		$2,725,000		$2,725,000		$3,050,000		$3,600,000		$4,100,000		$4,100,000
Payout of investment			1.59 yr.		1.44 yr.		1.44 yr.		1.40 yr.		1.68 yr.		1.75 yr.		1.71 yr.
Cash position in 5 yr.			$4,825,525		$6,706,600		$6,737,625		$7,876,275		$7,120,050		$7,788,050		$7,861,050

reforming, and cat poly are the processes used; however, only 15.6 vol. per cent of premium gasoline can be produced even with deep reforming and with tetraethyl lead requirement of 3 cc. per gal.

Case 2—Houdriforming operated at moderate conditions is substituted for the thermal reforming of Case 1. The desired gasoline quality can be met with 3 cc. of lead in the premium gasoline and 2.3 cc. in the motor blend.

Case 2A—Houdriforming to a more severe degree than in Case 2 results in reduction of lead requirements to 1.85 cc. per gallon for the premium and 1.75 cc. per gallon for the motor blend.

Case 3—Houdriflow catalytic cracking (feed preparation includes tar separator and visbreaker) in recycle operation supplants the thermal cracker of Case 1. With no reforming, only 10 per cent of the gasoline can be sold as premium because the catalytic gasoline, to bring the low-octane straightrun naphtha to salable octane levels, must largely be included in the motor blend; 3 cc. of lead is needed in each blend.

Case 3A—To the Houdriflow cracking of Case 3, mild thermal reforming (8 wt. per cent C_4 and lighter) is added. As a result premium and motor blends meet specifications with use of 1.8 cc. TEL per gallon.

Case 4—Houdriforming (same severity as used in Case 2) is added to the Houdriflow cracking of Case 3. Lead requirement for premium grade is 0.6 cc. per gallon while the motor blend uses 0.7 cc. per gallon. Octanes (F-1) of 94.5, premium, and 89.8,

TABLE 5—VALUATIONS FOR ECONOMICS

Stocks:	
East Texas crude, bbl.	$2.90
Premium gasoline (92 F-1), gal.	0.12
Motor gasoline (86 F-1), gal.	0.11
Straightrun gas oil, gal.	0.08
Fuel oil, bbl.	1.75
Fuel gas (F.O.E.), bbl.	0.84
n-Butane, gal.	0.05
Materials and utilities:	
Tetraethyl lead, cc.	0.00231
Steam, 1,000 lb.	0.30
Electricity, kw.-hr.	0.008
Cooling water, 1,000 gal.	0.005
Treated water, 1,000 gal.	0.10
Catalyst:	
Cat poly, lb.	0.30
Houdriflow, lb.	0.085
Royalty:	
Cat poly, bbl. of polymer	0.21
Houdriflow, bbl. of fresh feed	0.03
Houdriformer, bbl. of fresh feed	0.03
Miscellaneous:	
Operating labor (avg. incl. payroll burdens), hour	2.815

TABLE 6—INVESTMENTS (PROCESS EQUIPMENT ONLY)

Case No.—	1	2	2A	3	3A	4	4A
Crude unit	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Thermal cracker	900,000	900,000	900,000				
Thermal reformer	500,000				500,000		
Houdriformer		1,050,000	1,050,000			1,050,000	1,050,000
Houdriflow				2,200,000	2,200,000	2,200,000	2,200,000
Cat poly	350,000	275,000	275,000	350,000	400,000	350,000	350,000
Total	2,250,000	2,725,000	2,725,000	3,050,000	3,600,000	4,100,000	4,100,000

TABLE 7—NAPHTHA CHARGE STOCKS

	Mixed Base	Scurry	West Texas	California	East Texas
Gravity, °A.P.I.	51.5	52.4	51.7	46.7	52.7
A.S.T.M. distillation:					
I.b.p., °F.	286	220	236	267	238
10 per cent	298	237	266	292	266
50 per cent	312	277	306	323	300
90 per cent	349	361	366	369	358
E.p.	399	405	391	398	396
Reid vapor pressure	0.5			0.4	0.7
C.F.R. research octane:					
Clear	26.4	43.3	38.9	53.3	42.5
+ 3cc. TEL/gal.	49.7	69.4	60.8	70.6	65.8
Chemical analysis:					
Paraffins	44	35	43	19	44
Olefins	1	1	2	0	1
Naphthenes	44	52	42	65	43
Aromatics	11	12	13	16	12

Yield-Octane Curves

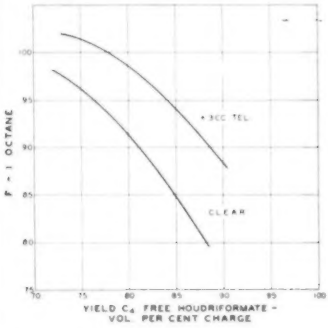


Fig. 2—Mixed-base naphtha charge (286°-399° F., 26.4 F-1 clear).

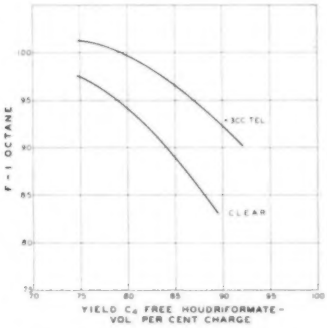


Fig. 3—Scurry naphtha charge stock (220°-405° F., 43.3 F-1 clear).

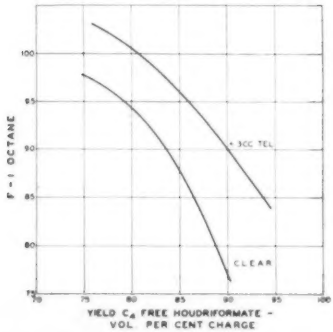


Fig. 4—West Texas naphtha stock (236°-391° F., 38.9 F-1 clear).

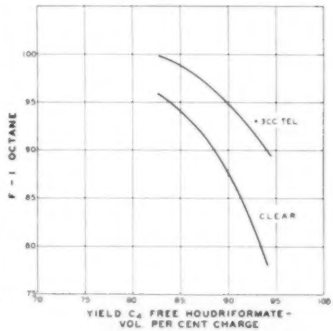


Fig. 5—California naphtha charge (267°-398° F., 53.3 F-1 clear).

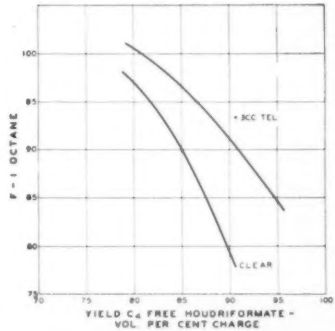


Fig. 6—East Texas naphtha stock (238°-396° F., 42.5 F-1 clear).

motor, can be obtained with 2 cc. TEL per gallon.

Case 4A—A milder Houdriforming operation than in Case 4 results in a slightly greater lead requirement, 1.05 cc. per gallon for each grade of gasoline. This milder reforming shows to advantage since the lead requirement in Case 4 is so low.

Total gasoline product yield for each case and the research octanes obtained when using 2 or 3 cc. per gallon of tetraethyl lead are presented in Table 3.

Yields and economics are summarized in Table 4. Material and product valuations assumed for the study are presented in Table 5. Operating and maintenance labor have been estimated based upon typical refinery practice. Maintenance material is considered as 2 per cent of the investment. Interest, insurance, and taxes are assumed to be 5 per cent of the investment. Federal income tax has not been included. Investments shown in Table 6 are for the primary process equipment. Storage and offsite auxiliary facilities are not included; consequently, net earnings are purely comparative.

TABLE 8—MIXED-BASE NAPHTHA PROCESSING

Debutanized gasoline, vol. per cent of charge	85.2	74.3
Butanes, vol. per cent of charge	5.8	11.0
Dry gas, wt. per cent of charge	7.7	14.8
Debutanized gasoline tests:		
Gravity, °A.P.I.	44.9	41.6
A.S.T.M. distillation:		
5 per cent, °F.	219	184
50 per cent	307	299
90 per cent	356	352
C.F.R. research octane:		
Clear	84.0	96.9
+ 3cc. TEL/gal.	94	101.7
Chemical analysis:		
Paraffins	45	31
Olefins	2	1
Naphthenes		
Aromatics	53	68
10-lb. R.v.p. gasoline yield, vol. per cent of charge	97.7	83.3
Extraneous n-butane required, vol. per cent of charge	6.7	
Excess butanes, vol. per cent of charge		2.0
C.F.R. research octane:		
Clear	86.4	96.9
+ 3cc. TEL/gal.	95.5	101.7

TABLE 9—SCURRY NAPHTHA PROCESSING

Debutanized gasoline, vol. per cent of charge	87.0	76.4
Butanes, vol. per cent of charge	4.4	8.5
Dry gas, wt. per cent of charge	6.2	13.0
Debutanized gasoline tests:		
Gravity, °A.P.I.	45.0	41.2
A.S.T.M. distillation:		
5 per cent, °F.	210	182
50 per cent	276	270
90 per cent	360	354
C.F.R. research octane:		
Clear	86.5	96.7
+ 3cc. TEL/gal.	95.2	101
10-lb. R.v.p. gasoline yield, vol. per cent of charge	99.9	86.3
Extraneous n-butane required, vol. per cent of charge	8.5	1.4
Excess butane, vol. per cent of charge		
C.F.R. research octane:		
Clear	88.5	97.1
+ 3cc. TEL/gal.	96.5	101.3

In economic summary, Table 4, compare thermal cracking refineries containing, in Case 1, thermal reforming, or in Case 2 and 2A, Houdriforming. If we assume that a Houdriformer be installed new as opposed to a thermal reformer installed new, the differential profits of Case 2 or Case 2A over Case 1, $1,291 and $1,308 per calendar day respectively, will retire the incremental investment, $475,000, in 1 year and a 5-year cash position of $1,881,075 or $1,912,000 will be achieved. If, on the other hand, we assume that an existing thermal reformer be replaced by a new Houdriformer and that no credit be allowed for reuse of parts of the old reformer, the differential return, $1,291 per calendar day, will retire the new investment, $1,050,000, in 2.22 years and the cash position in 5 years is $1,306,075 greater than Case 1.

Compare catalytic cracking refineries, Case 3, 3A, 4, and 4A. The refinery of Case 3 has difficulty meeting the specified octane levels so that some type of reforming is indicated. We can install thermal reforming, Case 3A, or Houdriforming, Case 4 or 4A. Differential earnings of Case 4 and 4A over 3A are $640 and $680 per calendar day, sufficient to pay off the incremental investment, $500,000, in 2.14 and 2.01 years respectively.

The results shown are by no means limited to East Texas stocks. To illustrate applications of Houdriforming operations to other stocks generally processed by refiners in the United States, data are presented on Houdriforming of five typical naphthas. (See Table 7.) A mixed-base naphtha having a research octane of 26.4 clearly demonstrates what can be done with low octane charge. (See Table 8.) Scurry naphtha is illustrative of a naphtha from a prolific new crude source and one which many refiners are now processing. (See Table 9.) Sour West Texas naphtha is an example of a high sulfur stock (see Table 10), a type of stock which more and more refiners are processing. California naphtha is illustrative of a high naphthene content charge. (See Table 11.) Finally, the East Texas naphtha, which was used in the economic study, is illustrated. (See Table 12.) The yields and tests presented were chosen to show results obtained at 85 and 95 research clear levels.

(Continued on page 100)

TABLE 10—WEST TEXAS NAPHTHA PROCESSING

Debutanized gasoline, vol. per cent of charge	86.4	78.0
Butanes, vol. per cent of charge	4.6	8.7
Dry gas, wt. per cent of charge	7.3	12.5
Debutanized gasoline tests:		
Gravity, °A.P.I.	45.2	42.0
A.S.T.M. distillation:		
5 per cent, °F.	220	202
50 per cent	289	283
90 per cent	359	357
C.F.R. research octane:		
Clear	85.3	95.3
+ 3cc. TEL/gal.	95.3	101.3
Chemical analysis:		
Paraffins	45	31
Olefins	2	1
Naphthenes	0	0
Aromatics	53	65
10-lb. R.v.p. gasoline yield, vol. per cent of charge	99.3	87.4
Extraneous n-butane required, vol. per cent of charge	8.3	0.7
Excess butanes, vol. per cent of charge		
C.F.R. research octane:		
Clear	87.3	95.6
+ 3cc. TEL/gal.	96.5	101.5

TABLE 11—CALIFORNIA NAPHTHA PROCESSING

Debutanized gasoline, vol. per cent of charge	90.8	83.6
Butanes, vol. per cent of charge	2.0	5.1
Dry gas, wt. per cent of charge	5.1	9.6
Debutanized gasoline tests:		
Gravity, °A.P.I.	40.3	38.0
A.S.T.M. distillation:		
5 per cent, °F.	261	234
50 per cent	324	318
90 per cent	380	382
C.F.R. research octane:		
Clear	85.6	95.2
+ 3cc. TEL/gal.	94.0	99.5
Chemical analysis:		
Paraffins	30	28
Olefins	2	2
Naphthenes	12	3
Aromatics	56	67
10-lb. R.v.p. gasoline yield, vol. per cent of charge	105.4	96.3
Extraneous n-butane required, vol. per cent of charge	12.6	7.6
Excess butanes, vol. per cent of charge		
C.F.R. research octane:		
Clear	87.7	95.7
+ 3cc. TEL/gal.	95.7	100.2

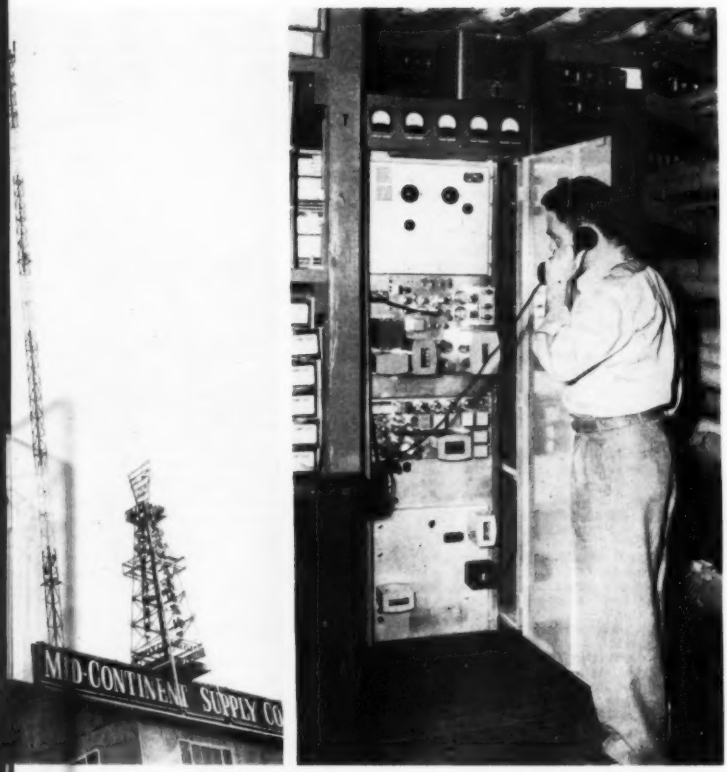
TABLE 12—EAST TEXAS NAPHTHA PROCESSING

Debutanized gasoline, vol. per cent of charge	86.5	81.0
Butanes, vol. per cent of charge	5.8	9.0
Dry gas, wt. per cent of charge	6.8	10.5
Debutanized gasoline tests:		
Gravity, °A.P.I.	46.0	43.6
A.S.T.M. distillation:		
5 per cent, °F.	220	200
50 per cent	288	282
90 per cent	356	352
C.F.R. research octane:		
Clear	87	95
+ 3cc. TEL/gal.	95.2	100
Chemical analysis:		
Paraffins	45	
Olefins	2	
Naphthenes	2	
Aromatics	51	
10-lb. R.v.p. gasoline yield, vol. per cent of charge	98.3	89.5
Extraneous n-butane required, vol. per cent of charge	6.0	
Excess butanes, vol. per cent of charge		0.5
C.F.R. research octanes:		
Clear	88.7	95.5
+ 3cc. TEL/gal.	96.4	100.2

TABLE 13—SULFUR REMOVAL

Debutanized Houdriformate recovery, volume per cent	Sulfur in Houdriformate, weight per cent	Sulfur removal, per cent
85.0	0.003	98.8
90.4	0.008	96.8
86.4	0.010	96.2
84.5	0.008	97.0

Charge stock: 51.7° A.P.I. West Texas naphtha (38.9 F-1), sulfur content, 0.23 wt. per cent.



This 180-ft. tower, left, at Snyder, Tex., has a range, using 250-watt equipment, of 50-60 miles. Car-to-car range is around 25 miles. When 280-ft. relay tower is completed at Lamesa, all stores and all cars will be within range of each other. View at right shows radio sending and receiving unit mounted in cabinet, with speaker above the cabinet.

Supply Firm Uses Mobile Radio In its West Texas Operations

by Carl Hoot
Dallas District Editor

Initial installation proved so successful that work is being rushed to equip eight stores in the Permian basin

MOBILE radio is now working for the supply companies, providing direct communication between service cars, the drilling rig, and the field store.

First installation was in January of this year by Mid-Continent Supply Co. at the Snyder, Tex., store. Work is being rushed to equip its eight stores located throughout the Permian basin. Two-way service will be available at Midland, Odessa, Brownfield, Kermit, and Sundown, Tex., and at Hobbs and Eunice, N. M. A 280-ft. relay tower for the entire operation is under construction at Lamesa, Tex.

The company's permit, KKG526, operates on 43.14 megacycles at 250 watts, with a range capacity of 50 to 60 miles. Operation is around the clock. Mobile units operate on the standard battery equipment of the car and do not require a booster. Car-to-car operation is obtainable if the cars are in a 25-mile radius of each other. Transmitting and receiving in the office may be done from either the cabinet unit in the warehouse or from a remote-control phone in an outer office.

Rules and regulations. — The Federal Communications Commission has established certain categories of service for use by industry, and oil operations come under two listings. These are "petroleum radio service," and "special industrial radio service."

Service-company licensing is in the special industrial category. The petroleum channels are heavily loaded with production and drilling activities and the high concentration of radio operations in oil-field areas would have meant heavy loading of these channels. Therefore, when the service companies were placed in the special industrial category, more channels were made available for use by the petroleum industry as a whole.

FCC does not license radio for use by salesmen or delivery services as such but supply companies are acknowledged to do far more important work than simply selling and delivering equipment. They provide a vital service in the construction of the drilling rigs out on location, as well as providing emergency repair facilities. It was on this basis that Mid-Continent was issued its license.

Eligibility clause. — The following applies to the special industrial radio service category. A person is eligible to operate a radio station under this classification when such person is engaged in an industrial activity, the primary function of which is devoted to production, construction, fabrication, manufacturing, or similar processes as distinguished from activities of a service or distribution nature, and in addition meets one or more of the following requirements:

1. The industrial operation for which radio is desired is being conducted in a remote or sparsely settled region.

2. The industrial operation is a construction project of a public character.

3. The use of radio is required within the yard area of a single plant for mobile service communications and the use of the low-power industrial service does not meet the operational requirements of the industry otherwise found eligible under this subparagraph.

Each application for authority to operate in the special industrial radio service shall be accompanied by a statement in detail sufficient to indicate clearly the applicant's eligibility.

Companies which furnish production and construction services to the petroleum industry, such as acidizing, cementing, perforating, testing, logging, construction, etc., are eligible for licensing under "special industrial radio service" rules.

Working range.—In radio frequencies used for industrial mobile com-

munications (25-50 and 148-174 megacycles), radio waves travel essentially in straight lines and operating range is limited by the earth's curvature. However, radio waves do bend on occasion and distances of about twice the geometric line-of-sight are said to be normal in the 25-50 megacycle band.

Certain conditions of humidity and temperature cause the radio waves to bend more than normal and follow more closely the curvature of the earth. This condition generally exists early in the morning.

In addition to the power of equipment and antenna height, other factors having a marked influence upon range include the terrain to be covered, electrical noise level at the station, and weather conditions.

Based on experience of operations in the Southwest, the following are considered average figures for operation in the 25-50 megacycle band, using 50-watt station and 50-watt mobile equipment:

	Miles
Mobile to mobile	15
Station with 60-ft. antenna to mobile	25
Station with 180-ft. antenna to mobile	40
Station to station, both 180-ft. antenna	70
Drilling rigs (130-ft. derrick) to mobile	35
Drilling rig to drilling rig	50-60
Station (180-ft. antenna) to drilling rig	50-70

The above represent average range figures for flat and rolling terrain. Greater ranges are possible by selecting points having higher ground elevation.

Directional antennas at the station increase the above ranges by as much as 50 per cent, and with directional antennas on both stations and rigs it is possible to increase the range more than 50 per cent.

Application for license.—All radio stations must be licensed by FCC. Licenses in the petroleum radio service are obtained without cost upon proper application showing eligibility. Eligibility for petroleum radio service is limited to those defined as being in the business of prospecting for, producing, or transporting petroleum and petroleum products. The term prospecting covers geophysical and drilling operations. FCC has allocated some 30 exclusive channels for the use of the petroleum industry.

Applications for licensing are made after obtaining a recommendation for a specific channel from the Petroleum Radio Coordinating Committee. Various radio companies throughout the country have the necessary application forms and will assist in their preparation for filing before FCC.

Operation interference.—An important consideration for an operation being planned in an area of considerable mobile radio activity, such as that which exists in most parts of the Gulf Coast region, West Texas, and North Texas-Oklahoma, is the selection of equipment which will permit operation without static or interference from adjacent channel users.

FCC has allocated all channels in the 25-50 megacycle band on a 40-kilocycle spacing. Using wide-band (40 kilocycle) F.M. equipment, stations will interfere with each other when operated in the same town or the same immediate area. Therefore, nearly all manufacturers now offer narrow-band (20 kilocycle) equipment which makes possible the operation of stations in the same town or immediate area on adjacent channels without interference.

Radio for Mid-Continent's stores, cars, and relay station is being installed and maintained by Communications Engineering Co., Dallas, and is General Electric Co.'s narrow-band equipment.

. . . and Well-Logging Companies Find Radio a Useful Tool

AN innovation in well logging is now under way by Rotary Engineering & Manufacturing Co., Inc., Midland, Tex., where radio is being utilized to transmit to a central headquarters logging data and lithology plots almost the minute they are taken at the drilling site. Radio is used to report correlation of mud and formation samples, which are analyzed on the spot and then transmitted instantaneously to the Rotary headquarters.

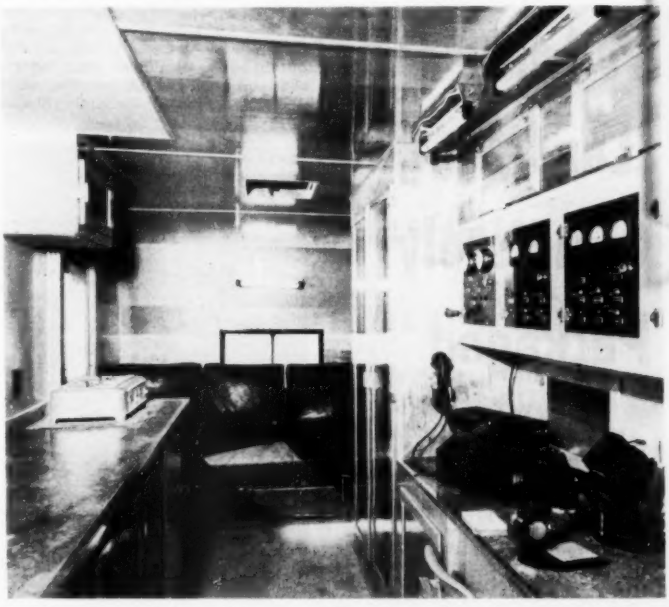
Radio-relayed information comes to the central location from field laboratories at more than 26 locations scattered throughout the Permian basin.

Engineers on duty send reports of each foot drilled when it comes from the bit, and a cutting sample is made and analyzed through trailer logging laboratories operating in the fields.

The data logged and recorded include gas analysis of the cuttings, gas analysis of the mud, oil analysis of the cuttings, microscopic examination of the cuttings for the lithologic plot. Also recorded are drilling rate, all the drilling-mud characteristics, and the bit record.

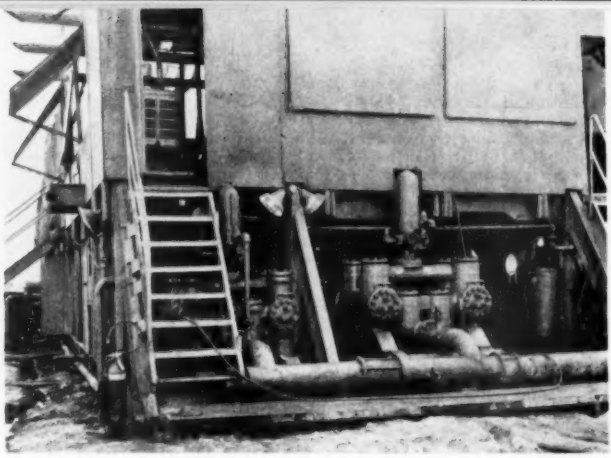
By obtaining these data the operator can control his coring and drill-stem-testing program and be sure that no possible gas or oil pay sections are passed up.

Fleets of trailers for laboratories are furnished by Travelite Trailer Co., Fort Worth, Tex., manufacturer of the trailers on an assembly-line basis. The trailers are built so that radio and other special equipment can be easily installed.



Interior of one of the radio-equipped Travelite trailers now used by Rotary Engineering Co. to send log data from scattered parts of the Permian basin to a central headquarters.

Permanent mounting of mud pumps in the substructure, along with some water tankage and change and tool houses, gives the Wilshire rig a very clean and compact outline.



Just the ends of the pump cylinders and suction piping project beyond the ends of the substructure. Along the side are doors and sheet-metal, forming the integrally built tool rooms and a locker room.

Wilshire Oil's 'Land Barge' Completely Packaged

by Roy F. Carlson
West Texas District Editor

MORE and more, drilling companies are making drilling machinery into packaged units so that moves between locations can be made as rapidly as possible. Particularly in areas of virtually flat surface terrain has the unitization idea been applied, and one of the foremost of these areas is the Permian basin of West Texas and Southeast New Mexico.

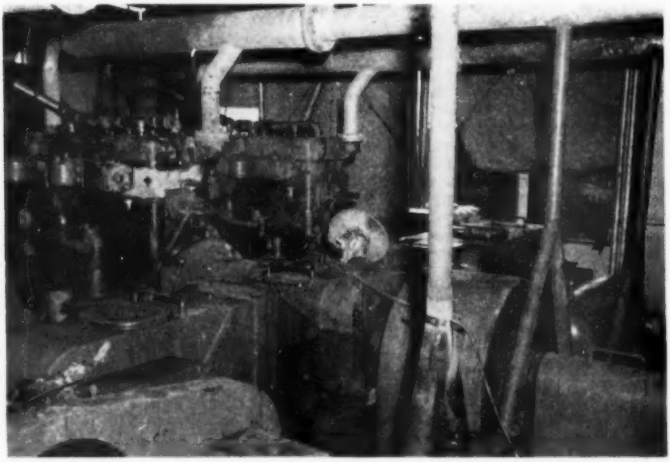
One of these packaged rigs, belonging to Wilshire Oil Co., currently is drilling in the Pembrook area of the Spraberry trend. Except for drill pipe and drill-pipe racks, a change house, fuel storage tanks, and some extra water tankage, the rig is completely packaged, and can be moved as a unit by skidding on tracks without breaking it down. And most of that equipment is not essential to the drilling operation since the pumps, mud pits, shale shaker, a change house, a tool house, and water tanks are built into the substructure and are a permanent part of it.

MOVING RIGS INTACT REDUCES

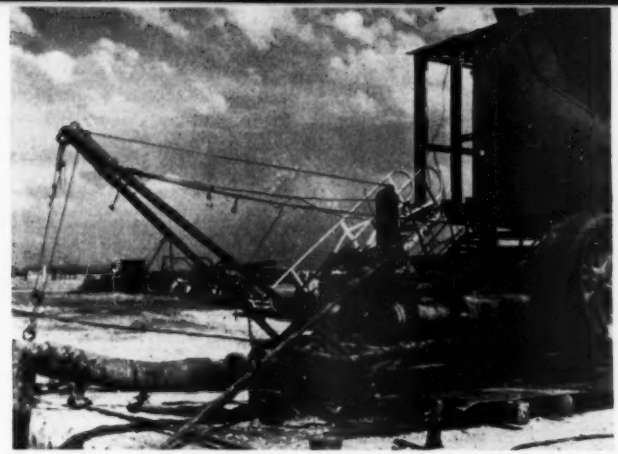
IN PERMIAN BASIN AREA

Unitization of the rig has made extremely rapid moves possible, by far the longest part of such an operation being the actual skidding from one location to another. The entire rig can be prepared for moving in about an hour's time, and can be drilling within an hour after rig movers lower it at a new location. Total elapsed time for such a move would be about 8 to 10 hours from one location to another, including all time for preparation to move.

(Continued on page 86)



Mud pumps are driven through a high-low underdrive from the rig compound, belting running nearly vertical through the rig floor. Drive shown here turns auxiliary pump.



Mud pump on its own skid is moved as a unit and then connected into piping on the substructure. V-belts are attached, suction hose is lowered, belt guard is dropped into place, and pump is ready to run.

Everything but the mud pump is on the move to new location. Rig was transported ⅜ mile, settled on new location, and drillers had surface casing set in 12 hours time.

COSTS, SPEEDS UP COMPLETIONS

IN SOUTH CENTRAL TEXAS

Gardner Starts Making Hole 5 Hours After Moving Begins

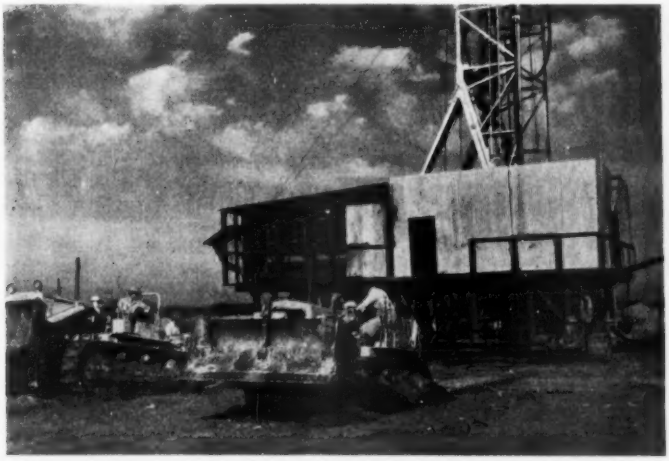
by Carl Hoot
Dallas District Editor

CONDITIONS found in Fort Chadbourne field of Runnels County, Texas, present a fairly representative picture of drilling problems to be met in many areas, with the exception of those problems due to greater depth. In this area the drilling is hard, and rock bits are used from surface to final depth.

In early development of the field, operators often had stuck drill pipe while going through a shaly reef section, starting around 3,500-3,700 ft. The field's pay section is known locally as the Odom lime which averages 20 ft. in thickness and is found at about 5,400 ft.

Standardization of drilling practices, plus a little ingenuity in the way of assembling and of handling equipment, has enabled Gardner Brothers Drilling Co. to set and maintain a productive schedule. Up to to near the end of this year's first quarter this company had drilled 19 wells in Fort Chadbourne field for Humble Oil & Refining Co.

A typical Gardner operation in the area is Humble's B-71 Sallie Odom.

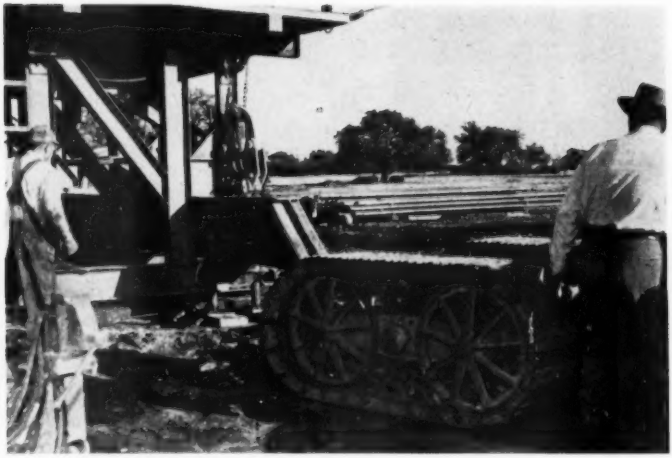


Tractors dig in to pull the derrick off location with winches. After pulling a few feet, tow bars replace wire line, and tractors in tandem move to new location.

Equipment on this well consisted of a 131-ft. Lee C. Moore portable mast, mounted on a 9-ft. substructure which was fabricated in Gardner's shops at Odessa. Skids for portable mounting of the mud pump and pipe racks were also fabricated in Gardner's shop.

The rig, a National 50-A, is powered by two Superior 350-hp. gas engines driving the rotary and a 7¾ by 18 mud pump.

On heavy-duty rigs, steel tanks are



Hydraulic jacks on either side of the crossbeam have the structure off the ground, ready for the Athey wagons.

used for mud pits. However, where drilling time is short and the surface formation will hold water without undue loss, ordinary pits are used.

Wire lines for medium-duty drilling operations are handed down from heavy-duty rigs, thus adding to the economic life of the lines. This procedure also provides a substantial safety factor for deep operations.

In drilling the B-71 Odom, 32 rock bits were used. These included a rerun on an 11-in. bit, which drilled 364 ft. of hole for surface pipe. From that point, $7\frac{7}{8}$-in. bits were used all the way down except for drilling cement plug.

Water was used in drilling down to 3,731 ft., at which point it was mudded up, using soda ash, Carbonox, Aquagel, caustic soda, and Kembreak. On most other wells it has been necessary to use an oil emulsion when penetrating the shaly reef.

On the B-71 Sallie Odom, 6.5 hours total time out for drill-stem tests prevented the crews from setting a record for their own drilling. Previous wells have been drilled in from 19 to 20 days, where drill-stem tests have not been required.

Factors contributing to the fast drilling time are:

Rumbaugh Rig Co. moved the rig intact, with nothing disconnected but power lines and portable mud pump. Humble had pits and location prepared at the new well site, including water in the sump pit. Gas for drilling was piped to the location.

Moving day.—Trucks were at the well at 8 a.m. and the morning-tour drilling crew disconnected power, water, and mud lines. Rig movers arrived on schedule at 9 a.m. and went to work on getting the derrick on jacks. When the rig had been winched off location, to get it away from the completed well hookup, two large crossbeams were slid into place in special channels built into the substructure.

Hydraulic jacks lifted each corner of the structure to sufficient height so that Athey wagons (Rumbaugh's patented track-type trucks) could be pushed in place under the crossbeams which then served as carrying members. With the Athey wagons in place, the jacks were bled off and the beams allowed to settle into position on the wagons. On this well these wagons were in place and the rig was under way to its new location by 10:45 a.m. The flat country, although soft on the surface, allowed the tractors to move at a good pace over an approximate $\frac{3}{8}$ mile to the new location.

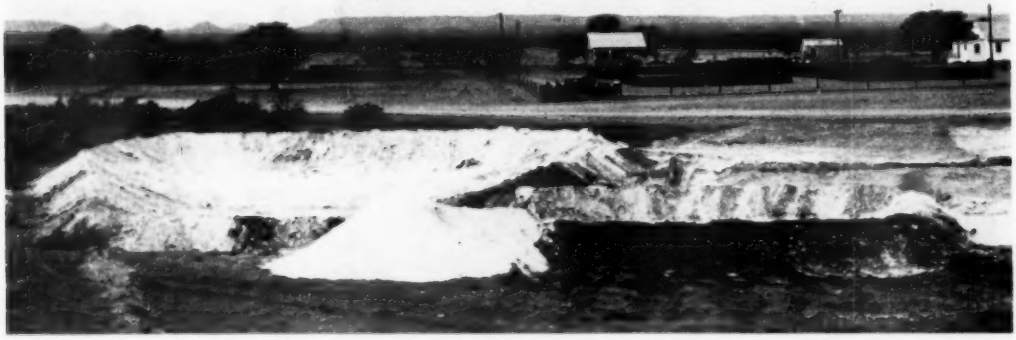
Tanks, bunkhouse, pipe racks, pipe and other supplies, including all loose junk around the well had been previously brought in by trucks. The mud pump on its own base and carrying its connecting hoses, had been set down in position and was ready for operation on connection of V-belts to the drive.

The rig was jockeyed into position and set down at 11:30 a.m., just $2\frac{1}{2}$ hours after starting the job of moving. Minor jobs such as stringing lights, connecting fuel and water lines, and running up the portable electric power unit, were taken care of by the drilling crew.

Couplings between mud pump and the mud piping are a permanent part of the substructure. V-belts were put on the pump and the belt guard lowered from the derrick floor, to which it was hinged. At 12:30 p.m. the engines were warming up and at 1 p.m., 5 hours from arrival of the first truck, the driller was making hole on a new well.

By midafternoon Halliburton had a cementing truck at the well and about 8 p.m. drilling was stopped to set 364 ft. of surface casing. Humble allowed 24 hours waiting-on-cement time, during which the crew gave the rig a general housecleaning.

Completion of the well was 24 days later, which included time for four drill-stem tests, circulating for samples, and electrical surveys by both Schlumberger Well Surveying Corp. and Lane Wells Co.



Surface conditions and material allowed mud pits to be dug with a bulldozer. Humble prepared the location, supplied water, fuel, and mud for drilling.

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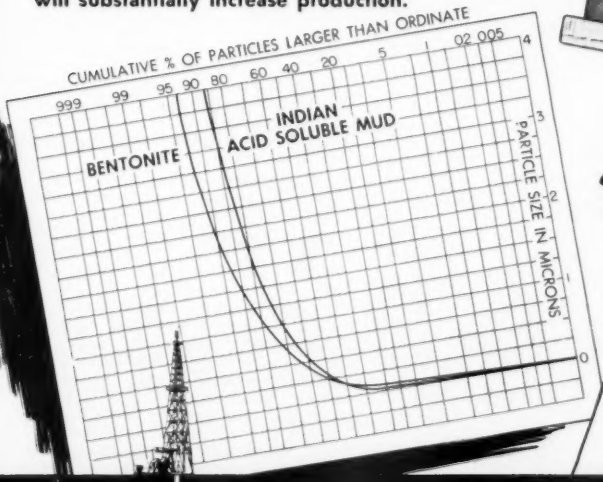
Field tests in sand pay zones have shown a light acid wash used on INDIAN Acid Soluble Drilling Mud will substantially increase production.



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Wilshire Oil's "Land Barge"

(Continued from page 82)

loading on tracks, skidding, and lowering and preparing to drill at the new location.

Construction

The rig is erected on what are essentially two long parallel box sections of structural steel, joined together at the back of the rig, that form the substructure. These sections are covered on the bottom by ½-in. steel plating to eliminate use of matting boards at the leveled drilling site.

At its forward end the substructure is open, the only structural member being a pinned beam across the base of the substructure between the box sections, easily removable so that the rig may be skidded into position over the location stake. With such construction, the rig bears a close resemblance to barge-mounted rigs used in marshy areas, and so has been aptly named a "land barge" rig.

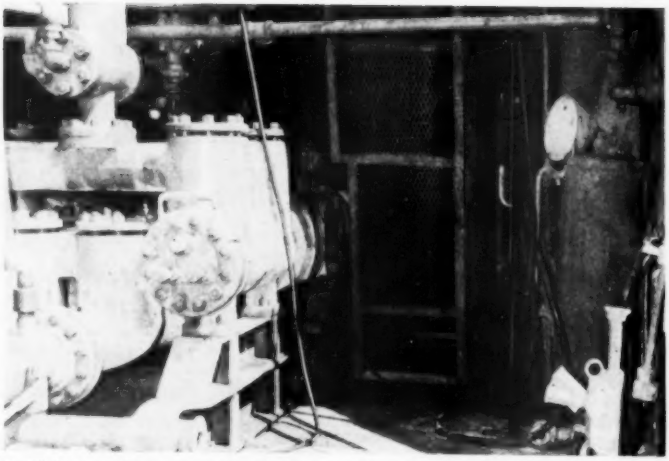
Except for dry-mud storage, a complete mud system is included in the substructure of the rig, and this is perhaps the most interesting feature of the rig. As shown by the photographs and drawing, mud pits, complete with all allied equipment, are included within the section of the substructure under the driller's position, and run almost its entire length. Sides of the pits are formed of ¼-in. plate, the bottoms being formed by the plating at the bottom of the substructure. Capacity of these pits is about 200 bbl.

Two water-storage tanks are built into the center of the substructure between the two main sections, just behind the rotary-table area. These hold about 120 bbl. of water each in reserve for the mud system.

Two mud pumps are also mounted in the substructure, a large one of 250 hydraulic horsepower, and a smaller one of 150 hydraulic horsepower. The larger one is mounted inside the rear of the substructure between the two main sections and is used for normal circulation work. The smaller pump is mounted inside the rear of the left box section, and is used for standby purposes, mud mixing, or other uses to which its size is adapted.

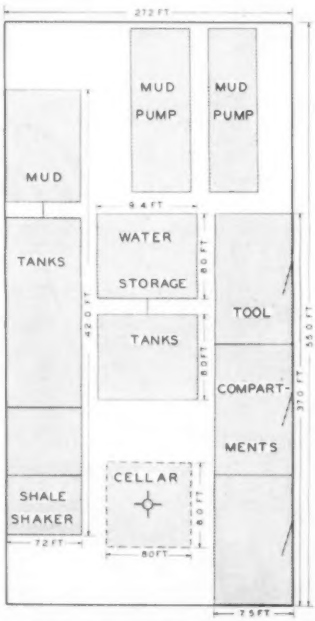
The mud pumps are manifolded together by welded steel piping, the same applying to nearly all of the mud lines within the unitized rig. Rigid connections such as these are permitted by virtue of the pumps never being moved or out of line when the rig is moved.

The rig includes a high-low pump drive from the compound through the rig floor with a belted underdrive arrangement. The two-pump two-speed combination give the rig extreme versatility for a power rig. Either or both pumps may be driven with this compound.



Sufficient working space is left in the substructure around the fluid ends of the pump for accessibility in reaching valves, liners, and rods. Guarded belting from the underdrive is shown at rear, just in front of the wall of one of the water storage tanks.

The shale shaker is mounted inside the substructure also, atop the end of the mud pits. It takes the effluent mud from the well bore very close to the bore, and discharges cuttings at the side of the substructure. In the pictures shown here the pits were not being used because lost-circulation trouble encountered in Spraberry wells necessitated a larger mud volume than is available in the steel pits in the substructure. For this trouble earthen pits were dug, and the pumps rigged to take suction from these.



Equipment spaced in substructure of Wilshire's National "50" rig.

The compound was built specially for this rig, driven by three 225-hp. gas engines, and providing the high-low takeoffs for the pump underdrives. One of the engine skids has been lengthened to provide room for the underdrive equipment for the standby pump. The other pump is driven from the back end of the compound through the underdrive from a clutch placed to the rear of the last engine.

The drilling rig is fitted with a 129-ft.-high mast and the substructure is 10 ft. high. The mast is of the double bulge design and permits standing of 20,000 ft. of pipe in the mast at one time. This feature permits having two strings of pipe at a time in the mast if that sort of drilling plan is necessary. This mast has only recently been added to the rig. The rig package weighs about 500 tons, this weight being one of the major disadvantages of the unit. Skidding the package requires the use of four crawler-type tractors.

An additional portable feature is the use of drill-pipe bins that also serve as pipe racks. These bins hold the pipe while in transit, permitting rapid loading and unloading of the pipe and protection for it while moving.

The rig, as it is now packaged but with a different type of mast, has drilled nine holes, the deepest being 8,500 ft. deep. It has drilled five 5,000-ft. holes and three 7,000-ft. holes, these latter being Spraberry wells.

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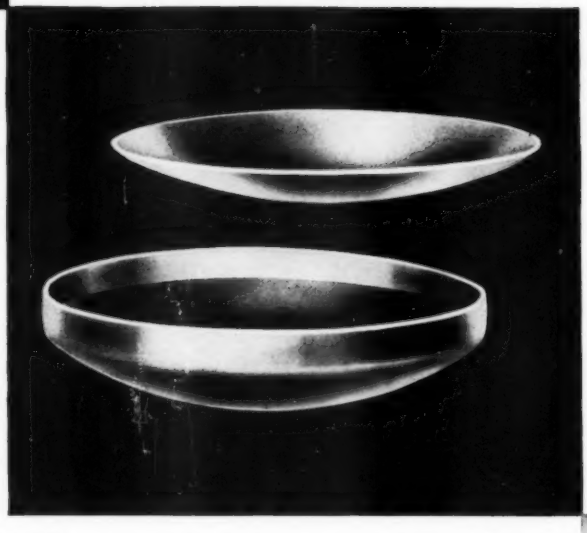

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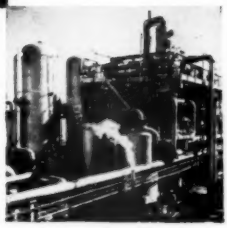

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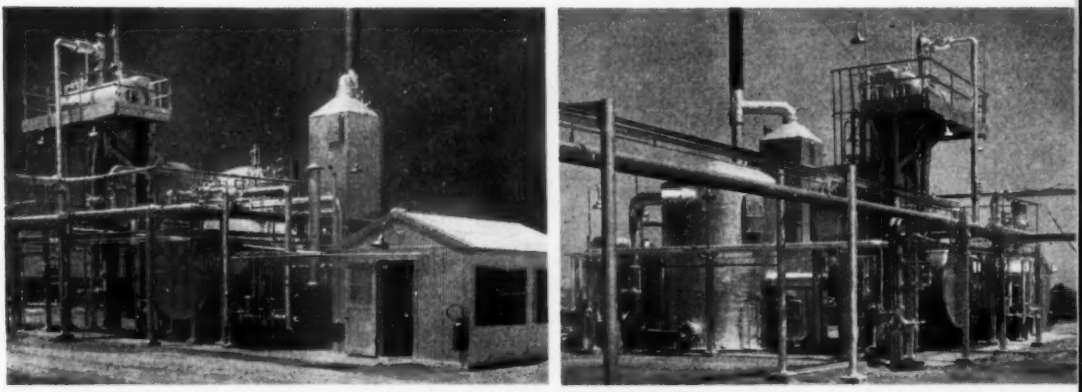

Two views of the 30-ton per day sulfur conversion plant operated by Shamrock Oil & Gas Corp. View at left is approximately 90° counterclockwise from that on right.

New light on

Processing Sulfur-Bearing Gases

by C. L. Blohm*

Supply problems, processing steps, and economic factors associated with sulfur recovery from gaseous streams are critically reviewed.

THE earliest developments in the processing of gases for hydrogen sulfide removal were engendered by the need for such treatment of manufactured gases to remove objectionable odor and possible hazard, or for requirements of specific processing in which the presence of hydrogen sulfide may have been otherwise undesirable. Probably the earliest such process employed lime slurries which were subsequently replaced by iron oxide beds or slurries to be followed by the development of inorganic chemical reaction processes such as the Koppers Seaboard process using soda ash, the Thylox process employing sodium thioarsenate, the Shell tripotassium phosphate process, and the sodium phenolate process. Foreign processes such as "Alkazid" which employed amino acids, and the Staatsmijnen-Otto process which employed the oxidation reduction system provided by a solution of prussian blue (ferri-ferrocyanide) were also developed.

All of the foregoing processes, while reasonably satisfactory for specific applications, had individual disadvantages and were not particularly amenable to the use of high-pressure purification of large quantities of natural gas to the purity required by most states, viz., less than 0.25 grain hydrogen sulfide per 100 standard cubic feet. A comprehensive review of such processes has been given by Blohm and Chapin.[1]

*Assistant manager, research and development, Fluor Corp., Ltd., Los Angeles. Presented at Natural Gasoline Association of America regional meeting, Odessa, Tex., February 29, 1952.

Earliest Patent in 1930

The impetus for the application of organic amine regenerative processes to the removal of both hydrogen sulfide and carbon dioxide from gases was provided by the investigations of R. R. Bottoms,[2] who obtained his earliest patent in 1930 for the use of such materials in this manner. Although Bottoms' patent covered the use of a great number of organic amines free of carbonyl or carboxyl groups (to distinguish them from the amino acids), the amines of commercial importance in this application have been pretty generally confined to a specific group of alkanolamines, particularly the mono di and triethanolamines. Of these, monoethanolamine has received greatest acceptance for the high-pressure treatment of natural gases, while diethanolamine has found considerable application in lower-pressure treatment of refinery gases, particularly where liquid treating of L.P.G. or gasoline has been concurrently desirable.

There have been some improvements in the application of these amine processes, the most significant of which is covered by a patent issued in 1939 to A. J. L. Hutchinson[3] describing the glycol-amine process, the principal feature of which is simultaneous desulfurization, carbon dioxide removal, and dehydration in a single-stream process. The fundamental flow scheme of Bottoms' original process has not been altered, except for minor modifications such as, for example, the two-stream processes disclosed by Shoeld,[4] McCartney,[5,6] and Chapin,[7] or the use of regeneration at elevated pressures disclosed by Reed.[8]

Over the period of the last decade, the continued large-scale application of the above processes has demonstrated their economic and technical suitability, the principal difficulty with their use being corrosion of carbon-steel equipment, particularly heat-exchanger and reboiler surfaces. Considerable effort has been expended in the study of these corrosion phenomena by several investigators[9,10,11,12] and to date several reasonably satisfactory solutions have been provided, although the problems are still of some significance in certain specific installations.

An important outgrowth of the treatment of both natural and refinery gases for hydrogen sulfide re-

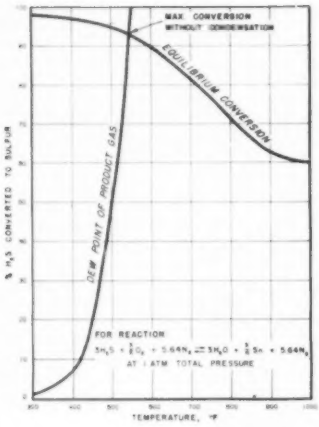

Fig. 1—Theoretical equilibrium conversion and dew-point curves for burning pure H S in reaction indicated.

moval has been the increasing necessity for satisfactory means of disposal of this undesirable and toxic material. In the past, general practice in natural-gas treating has been to "dispose of the hydrogen sulfide by adding sufficient hydrocarbon to the acid gas stream to make it satisfactorily combustible and flaring the combustion products to the atmosphere. In most instances this has been an expedient, but not altogether satisfactory disposal means. However, in the application of gas-treating processes in most refineries which are usually located in populous areas it has been necessary to resort to other methods due to the unpleasant and noxious character of the combustion products from simple burning, plus the impositions placed on such procedure by atmospheric pollution controls. The most generally adopted practices until very recently were either that of diluting the acid gas with large quantities of hydrocarbon which were then used as plant fuel, or the sale of the concentrated hydrogen sulfide to adjacent sulfuric acid plants where it was possible to make such arrangements. In any event, the disposal problem had always provided a processing difficulty and was usually an operating expense.

A rather obvious solution to the above problem had been available to the industry for several years, but had been considered uneconomical and prior to 1946 had been applied only in one specific instance where the economies were quite favorable. This, of course, is the production of elemental sulfur from the waste hydrogen sulfide streams, a discussion of which follows.

Sulfur Recovery Processes

Although the basic principles of the conversion of hydrogen sulfide to elemental sulfur have been known for many years and were employed in Europe and other foreign locations in the Claus-Chance process[13,14], principal credit for commercial development of the process in this country goes to Southern Acid & Sulfur Co. (now a part of Mathieson Chemical Corp.) which during 1944 built and started operation of a plant to process the vent gas resulting from operations of McKamie Gas Cleaning Co. Operations at the McKamie plant proved so successful that the same company constructed a second plant in 1946 at Magnolia, Ark., utilizing the acid gas flared at Arkansas Fuel Oil Co.'s Columbia plant[15]. Again in 1951, Mathieson Chemical Corp. expanded the original McKamie plant to approximately twice its original production capacity.

Impetus for construction and operation of these earlier plants was provided by the fact that the operating company in this particular instance was already in the business of buying sulfur and producing sulfuric acid and found that due to favorable location and other factors, the sulfur-conversion process was economically attractive. However, there was little or no interest in such processing by companies engaged in gas treating at that date, since mined sulfur was readily available, inexpensive, and at a source where cheap water freight rates were applicable.

The foregoing situation began to show change in 1948 to 1949 due to the increase of world sulfur demand and resulting production shortage. Coupled with this were price changes in mined sulfur which gave sulfur from hydrogen sulfide a slightly more favorable position and the increasing necessity in populous areas for reduction of atmospheric pollution due to combustion of sulfur-bearing gases. Based on the latter requirement to a considerable extent, the third plant to be constructed and operated in this country was that of Hancock Chemical Co. in the Los Angeles area, completed in 1948. This company purchased hydrogen sulfide from several nearby refineries and in a composite conversion operation produced elemental sulfur which was sold to local sulfuric acid manufacturers.

Since 1948 the Hancock plant has been expanded to twice its original capacity and a considerable number of similar sulfur recovery plants have been or are presently being constructed throughout the United States, Canada, and Mexico.

Basic Chemistry, Technology

The basic chemistry and technology of the currently used conversion process have been described adequately elsewhere[15] and therefore need only

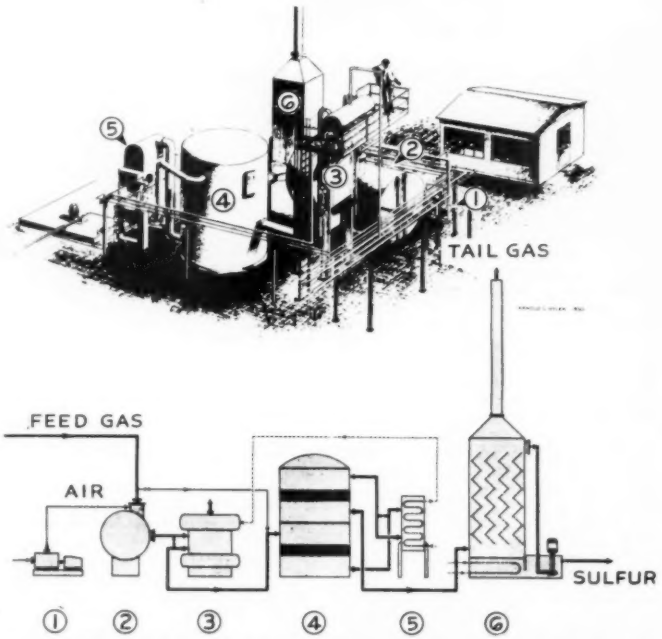

Fig. 2—Schematic layout of typical plant and process flow diagram for two-catalytic bed unit. Identification of items are: (1) air blower, (2) reactor furnace, (3) waste-heat boiler, (4) catalyst converter, (5) feed-water economizer, and (6) sulfur wash tower.

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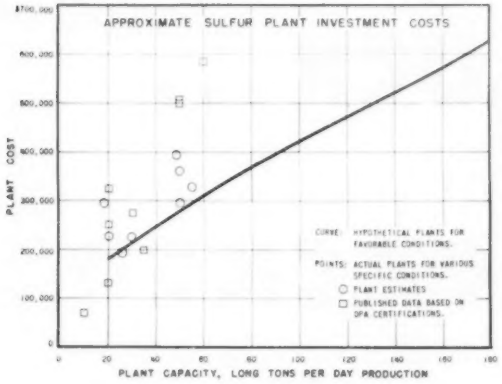
APPROXIMATE SULFUR PLANT INVESTMENT COSTS
PLANT COST
PLANT CAPACITY, LONG TONS PER DAY PRODUCTION
CURVE: HYPOTHETICAL PLANTS FOR FAVORABLE CONDITIONS.
POINTS: ACTUAL PLANTS FOR VARIOUS SPECIFIC CONDITIONS.
PLANT ESTIMATES
PUBLISHED DATA BASED ON DPA CERTIFICATIONS.

Fig. 3.

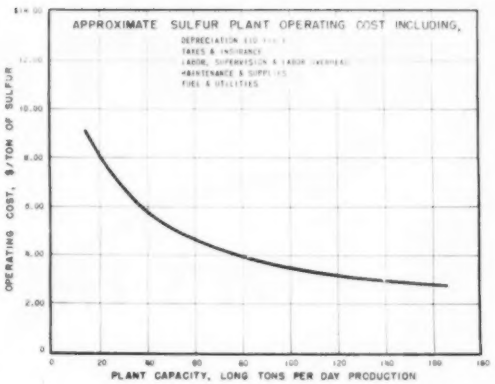
APPROXIMATE SULFUR PLANT OPERATING COST INCLUDING,
DEPRECIATION
TAXES & INSURANCE
LABOR, SUPERVISION & LABOR OVERHEAD
MAINTENANCE & SUPPLIES
FUEL & UTILITIES
OPERATING COST, $/TON OF SULFUR
PLANT CAPACITY, LONG TONS PER DAY PRODUCTION

Fig. 4.

brief review here. The conversion depends upon the simple over-all reaction:

$$3\,H_2S + 3\,2\,O_2 \rightleftharpoons 3\,S + 3\,H_2O$$

Actual plant designs can be modified to a considerable degree to satisfy the requirements of any specific application, but for purposes of illustration a flow diagram using two catalytic conversion stages will be described.

Looking at the basic chemistry of the reaction noted above, it should be observed that the simple equilibrium indicated is composed in practice of several equilibria involving sulfur dioxide, which is formed as an intermediate, and the several different molecular forms of sulfur existing in the vapor. The relative quantities of the various sulfur species are found to depend on temperature and sulfur partial pressure[16].

In Fig. 1 is shown the theoretical equilibrium conversion curve for pure hydrogen sulfide burned with the stoichiometric quantity of atmospheric air at one atmosphere total pressure according to the reaction indicated. In the reaction equation, the subscript "n" has been used to indicate sulfur in its several molecular forms. Obviously, this equilibrium conversion curve will be altered for other conditions in which the hydrogen sulfide is diluted with hydrocarbon or inert gases or in which the total pressure on the system may be different from that indicated.

Also shown in Fig. 1 is a curve representing the sulfur dew point of the product gas for the specific conditions indicated. This curve is of importance in commercial operation since it is necessary to maintain the catalytic conversion beds at a temperature above the dew-point curve in order to prevent condensation of sulfur on the catalyst surfaces. It is apparent therefore that for operation under these specific conditions the maximum theoretical conversion attainable in commercial practice will be in the order of 93 per cent as indicated by the intersection of the two curves.

If the equilibrium conversion curve is displaced downward, because of dilution of the feed hydrogen sulfide to less than 100 per cent concentration, the partial pressure of the product "S_n" will also be lower so that the sulfur dew point of the resultant product gas will be displaced to the left of the curve indicated. Again, if part of the sulfur content of the product gas is condensed and removed as, for example, between stages in a two-stage conversion process, the dew point of the product gas in the second converter will be decreased accordingly and it will be possible to operate at a lower and therefore more advantageous temperature. The removal of one of the reaction products (sulfur) also has the effect of shifting the equilibrium in the direction of increased yields. It is apparent, therefore, that commercial recoveries in excess of the 93 per cent indicated in Fig. 1 may be achieved, but only by careful manipulation of temperatures, pressures, and other process design variables.

Flow Scheme and Plant Layout

A typical plant layout and process flow diagram are shown in Fig. 2. The process flow pattern shown can be considered typical of a two catalytic conversion bed unit with interstage cooler and/or condenser. Many modifications of this process have been employed by various designers to fit specific conditions, and descriptions thereof are available in the literature. The typical plant layout in Fig. 2 is of some interest since it indicates the very compact manner in which a sulfur-conversion plant of reasonable capacity can be constructed. A plant of the type indicated for the production of 30 long tons per day of elemental sulfur, exclusive of control house and loading or storage facilities, can be erected within the limits of a site measuring 40 by 50 ft., that is, 2,000 sq. ft.

With regard to requirements for storage facilities, it is of interest to note that while many of the earlier plants of this type stored bulk, solid sulfur in a manner similar to that used by the sulfur-mine operators, recent practice wherever feasible has been to load liquid sulfur directly into tank cars fitted with steam coils and to transport and unload the sulfur in liquid form, saving considerable time, labor, and space in handling costs.

Economics

Let us now consider the investment and operating costs involved in the production of elemental sulfur from waste hydrogen sulfide[17]. For purpose of economic comparison, plants will be considered which utilize essentially the flow diagram indicated in Fig. 2 and operate with a feed gas containing approximately 75 per cent hydrogen sulfide, less than 2 per cent hydrocarbons (principally methane), and the remainder carbon dioxide. This gas stream will be available to the sulfur plant at a temperature of 100° F., saturated with water and at a pressure sufficient to drive it through the sulfur plant, which in general will not exceed 5 psig. Since other operating facilities such as the gas-treating plant will usually be in the immediate vicinity, it is assumed that utilities such as cooling water, boiler feed water, electricity, and startup fuel and steam are available at the plant site at a nominal cost.

Based upon the assumptions indicated above, there have been plotted in Figs. 3 and 4 approximate investment costs and operating costs for sulfur plants of various capacities at conditions which are favorable for this type of operation.

Fig. 3 shows, in addition, actual plant costs for specific plants for operation at a great variety of conditions and locations. Some of the data shown thereon were taken from published DPA certification lists[18] and it is recognized that such cost figures may include items not spe-

cifically pertinent to the actual cost of the sulfur conversion unit itself. However, all the points indicate the wide spread which may be encountered in investment cost requirements.

The curve in Fig. 4 indicates the considerable dependence of operating costs on plant size. In arriving at these operating costs an attempt has been made to use typical values for the factors such as depreciation, taxes and insurance, labor, maintenance, etc. Interest on the investment has not been included as an operating cost.

Labor costs for operation have been assumed to include, for small plants, approximately one-half man per shift which is to be made available from labor employed in adjacent operating facilities. This labor has been increased to a full man per shift in plants in excess of 80 tons per day of production. On the other hand, even in a small plant at a somewhat remote location, it may be necessary to employ full-time operating labor, in which case the labor costs are increased per ton of sulfur produced.

No cost has been assigned to the hydrogen sulfide raw material since it is assumed that the sulfur plant will be owned by the gas-treating company. This assumption, of course, will not be valid in many cases, the value of the hydrogen sulfide being dependent upon several factors among which are the plant size and location, and market availability. In some instances it may actually be necessary to credit a small sulfur plant for a nuisance-abatement value where atmospheric pollution is a major problem. There have been unofficial reports, however, of payments for raw hydrogen sulfide of amounts in the order of $3.00 to $4.00 per ton, indicating that in some instances at least the sulfur conversion processes can be economically attractive, even under an appreciable burden for the cost of raw material.

Since gas-treating plants which would commonly be operated in conjunction with such sulfur recovery plants require large quantities of steam for reboiler duty, credit has been taken at the rate of $0.20 per 1,000 lb. of 200-psig. steam produced by operation of the sulfur plant's waste heat boiler, it being estimated that approximately 5,000 lb. of such steam will be available per long ton of sulfur produced, assuming that electrically driven pumps and air blower are used in the sulfur plant. While advantage of this credit may be taken in new installations involving both gas-treating and sulfur-conversion-plant facilities, it may not be advantageous to do so where sulfur plants are built in conjunction with already operating treating and/or other installations.

The operating costs shown are direct costs only, and do not include indirect overhead cost of the parent company, sales and distribution costs, profits, or similar items. Such costs, of course, should be considered carefully in a complete profit study for any specific project. Finally, it should be pointed out that the operating costs for an isolated plant or one operated by a company which is separate from the gas treating company would be appreciably higher than for a captive operation in which such overhead costs as indicated above would be more equitably distributed. On the other hand, the impact of such additional costs becomes less severe as the size of the sulfur-producing installation increases, and need not be of any significant importance in reasonably large installations.

It might be well at this point to mention a specific process scheme which could have considerable bearing upon the over-all economics for a particular set of conditions. As pointed out above, the gas-treating operations normally preceding sulfur-recovery processes frequently require large solution circulation rates with consequent large equipment investment and high steam requirements.

In certain specific cases where sour gases bearing appreciable quantities of carbon dioxide in addition to their hydrogen sulfide are treated, and where at least a portion of their carbon dioxide content can be tolerated in the sweet gas from the treater, the selective absorption process utilizing methyldiethanolamine[19,20] may result in appreciable reduction of these solution rate and steam demands. In addition, there are a few instances in which the hydrogen sulfide content of residue gas from a normal treating operation is sufficiently low as compared with the carbon dioxide content that the gas stream is difficultly combustible in the furnace operation of the sulfur conversion unit. Again, it may be possible under proper conditions to beneficiate such a stream with regard to hydrogen sulfide content to bring it into the combustible range by the use of the selective treating process on the original hydrocarbon stream. Such process designs should be kept in mind, particularly when considering the construction of an entirely new facility which involves both gas treating and sulfur recovery, and may be adaptable in some instances to existing treating facilities where subsequent sulfur conversion is contemplated.

To relate to actual market price the costs discussed above, it is necessary to consider the transportation costs. Although water freight in general is usually less expensive than rail, the latter may be competitive for transportation of sulfur from the Gulf Coast to West Coast areas. On the other hand, there are several sources of sulfur from hydrogen sulfide to which no water transportation is available, in which actual rail costs must be used in computing ultimate market sales price.

TABLE 1—TYPICAL SULFUR FREIGHT RATES

	Per long ton
A. From Gulf Coast or Odessa, Texas, areas to:	
Los Angeles or San Francisco	$12.32
Northwest coast	16.13
Chicago	9.41
B. From Wyoming areas to:	
Los Angeles or San Francisco	12.32
Northwest coast	10.96
Lewiston, Idaho	9.86

Under A of Table 1 are shown typical freight rates in effect February 1952 from Gulf Coast and from certain points in the vicinity of Odessa, Tex., for crude bulk sulfur in carload lots to the desinations indicated. Under B of the same table are shown similar rates which have been established recently for shipment of bulk sulfur from Worland, Powell, Cody, and Thermopolis, Wyo., to the destinations indicated. The rates given include all increases to the date indicated, but do not include the 3 per cent transportation tax.

While the present posted price of crude bulk sulfur is $21.00 to $22.00 per long ton in carload lots at the mines, it should be recognized that the selling price in any specific area may not be entirely dependent upon these prices, since the demand greatly exceeds the supply in a good many locations. The ultimate value of a particular sulfur producing installation therefore is considerably dependent upon the intended market for the product.

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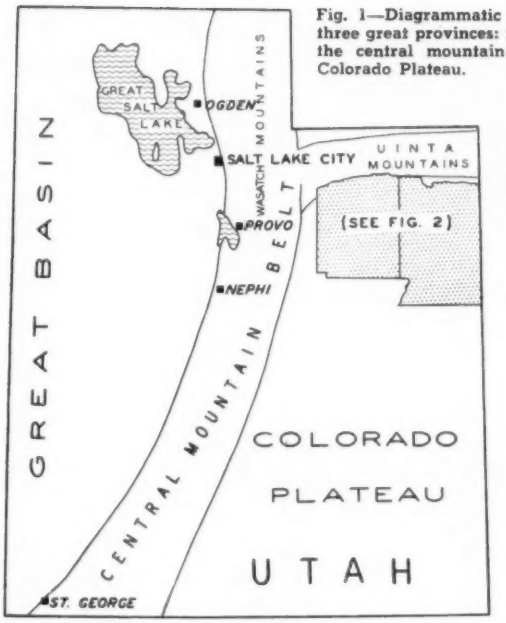

Fig. 1—Diagrammatic map of Utah's three great provinces: the great basin, the central mountain belt, and the Colorado Plateau.

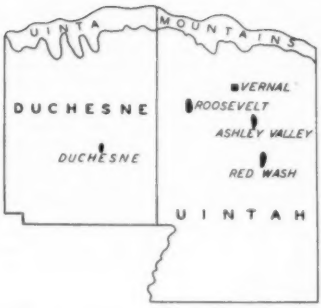

Fig. 2—(Right) Sketch map showing location of Utah's four commercial oil fields.

UTAH'S FUTURE IN OIL

by A. J. Eardley

A. J. Eardley has been with the geology department of University of Utah since 1949. Following undergraduate work at Stanford University and University of Utah, Eardley obtained his doctor's degree at Princeton University and taught geology at University of Michigan for 19 years. During the winter of 1951 he was on tour as an American Association of Petroleum Geologists distinguished lecturer, speaking on "The Tectonic Framework of North America.

Though Utah's discovery rate will be modest because of the difficulty of finding the valuable accumulations of oil that must be there, the state's production should be second only to Wyoming in the Rocky Mountain states within the next decade.

AN attempt today to appraise Utah's future as an oil and gas-producing state must be highlighted with optimism. Just 4 years ago such a report would have been shaded with pessimism. Today Utah has an established daily production of more than 4,000 bbl. of oil while in 1948 it had none.

Commercial fields.—The state now has four commercial oil fields: Ashley Valley producing from the Weber sandstone; Roosevelt, Red Wash, and Duchesne fields producing from the basal Green River. Also within its boundaries is Clay Basin gas field which has been helping to supply Salt Lake City with gas since 1937. Boundary Buttes gas field probably contains a good reserve but remains undeveloped and unused to date.

Very recently a combustible-gas field seems to have been discovered with the drilling in of the Clear Creek well in Carbon County, estimated to have a daily potential of 10 million cubic feet of gas. Another potential basal Green River oil discovery appears to be developing in the South Myton area of Duchesne County where a substantial recovery of oil has been made on a drill-stem test.

This significant record of discovery in the last 4 years could be projected into the future and a rosy picture, indeed, imagined. But there are a number of geologic factors that must be appraised before one can conclude on a rational basis whether or not future discoveries will continue at the rate of the past 4 years. The geologist who has followed the history of exploration in the state for the past 50 years appreciates the geologic factors all too well.

Criteria for Judging Reserves

Geologic criteria used in attempting to judge the possible and probable reserves of a comparatively little explored region are listed by A. I. Levorsen as follows:

1. Volume of sedimentary rocks.
2. Evidences of oil and gas at the surface.
3. Unconformities.
4. Wedge belts of porosity.

Volume of rocks.—As far as Utah is concerned let us consider the first criterion, volume of sedimentary rock. The idea here is that oil and gas occur in sedimentary rocks only, and that the more of such rock the better.

Utah may be divided conveniently into three great provinces, namely: the Great Basin, the Colorado Plateau, and the central mountain belt which includes the High Plateaus from St. George to Nephi, the Wasatch Mountains from Nephi northward to Idaho, and the Uinta Mountains. (See Fig. 1.)

All three provinces are underlain chiefly by sedimentary rock. I estimate that not more than 15 per cent of the state is underlain by nonsedimentary rock, and therefore, that 85 per cent of the state has a possibility of producing oil and gas, if only this one criterion is the basis for judging. But, other criteria need to be considered before becoming too optimistic.

Surface evidences.—Nothing is more meaningful in the exploration

Note: This article is the presidential address at the second annual meeting of the Rocky Mountain Section of the American Association of Petroleum Geologists, Salt Lake City, February 28-29, 1952.

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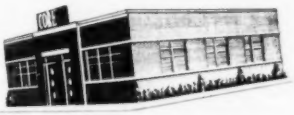
ON-LOCATION CORE ANALYSIS

STATION WAGON CORE ANALYSIS

SUITCASE CORE ANALYSIS

FROZEN CORES

SIDE WALL CORE ANALYSIS



OFF-LOCATION CORE ANALYSIS

WELL LOGGING (on-shore)

WELL LOGGING (off-shore)

WELL SAMPLING

RESERVOIR FLUID ANALYSIS

ENGINEERING STUDIES

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of oil and gas than direct signs at the surface of these materials. We have in mind oil and gas seeps, asphalt or bituminous sandstone, oil shales, and hydrocarbon dikes.

In Utah a number of oil seeps have been known for over 50 years. There is no place in the world that has solid hydrocarbon dikes of the variety, size, and number, as the Uinta basin of Utah. Although the origin of these dikes is still not clear they are generally considered to have had an association with oil or with material which could have been converted to oil. Their volume is very large and represents millions of barrels of oil.

Most everyone realizes that the Uinta and Piceance basins of Utah and Colorado contain one of the world's greatest, if not the greatest, oil-shale reserve. Several billion barrels of oil can be made from this reserve. Again, geologists are not yet sure what the relation is of the oil shale, the hydrocarbon dikes, and liquid oil recently discovered in the same formation, but certainly one of the worth-while theories considers that the three substances have much in common.

In the course of drilling over the past 30 years in the Colorado Plateau many shows of oil have been encountered, and these, together with the surface shows, point up Utah as a worth-while area for exploration.

Unconformities.—The third criterion by which to judge an area for its oil and gas possibilities is the presence or absence of unconformities. According to Levorsen:

"Much of our present and past oil production has been found associated with unconformities. They mark the position of overlaps, variable porosity, folding, and traps. Unconformities separate the various layers of geology and many mark the place in the geologic section of greatest stratigraphic and structural change. It is at unconformities that geologists and geophysicists most commonly make their mistakes—because it is here that the changes occur which are unpredictable.

"The presence of a known regional unconformity within an area increases the chances of finding favorable petroleum geology because it overlies and hides a new and unknown set of geologic conditions. It may not everywhere double the favorable area of prospecting but it certainly adds to it. Thus, an area with two or three known regional unconformities is two or three times more favorable to ultimate oil discovery than are area with none.

"Furthermore, if there is evidence in the region of preunconformity folding or deformation, the chances of finding oil are definitely more attractive than where there is an absence of such preunconformity deformation. Therefore, the unconformities which are known or thought to be present in each of the prospective areas are described as another factor favorable to oil accumulation."

These comments pertain most aptly to a geology like that of Kansas, Oklahoma, and Texas, but they are good cause for us to reflect on the unconformities in Utah. In the Great Basin the Devonian and Pennsylvanian systems are particularly the most significant for overlaps and facies changes; in the Colorado Plateau the Ancestral Rockies are the site of extensive Pennsylvanian and Permian clastic flanking deposits, and then of overlaps and complete burial in Triassic, Jurassic, and Cretaceous time.

As more wells are drilled and carefully tied to surface sections other unconformities will be discovered. The late Cretaceous and early Tertiary mountain building of the central mountain belt and the Uinta Mountains has resulted in extensive areas of overlap and unconformity.

Most Rocky Mountain oil to date has come from anticlines, and the finding of oil along unconformities is a more difficult task, but they will undoubtedly serve to focus much attention in the future. Searching for oil along unconformities seems to me the most promising course of action in the future.

Porosity wedges.—The last criterion mentioned is that of wedge belts of porosity:

"The reservoir rocks in many oil fields are in the form of a wedge belt of porosity. Simple examples are East Texas field, the Bartlesville sand province, and others of this type. Even where the individual pool is located on a structural trap, a fold, or a fault, the province as a whole may be determined by the presence of a regional wedge of porosity within the reservoir rock. Thus, much of the production in West Texas, in the Midway-Sunset area of California, or in the Cromwell sand of Oklahoma is found in local folds and structures which in turn are in the vicinity of the edge of a regional belt of porosity."

The extent of wedge belts of porosity in Utah is difficult to estimate at present. To distinguish wedge belts of porosity from unconformities is generally impossible on hand of existing information, and what has been said of the existence and distribution of unconformities applies as far as we know in Utah also to wedge belts of porosity. In our thick basin sections of sedimentary rocks it seems most probable to me that numerous wedges and pinchouts exist. It is up to the geologist to find them.

Unfavorable Factors

All that has been said so far may be listed on the favorable side of the ledger. Now, to keep our feet on the ground and to remain rational about the matter, we must realize some unfavorable elements.

First, a good many wells have been drilled for oil and gas in the state over the past 50 years—some 600 of them. Many of them were distinctly promotional and not based on sound geologic information, and therefore to the geologist, do not count. But, I believe I am right in saying that every strong anticlinal structure evident at the surface had an honest test without success before the first field, Ashley Valley, was brought in. Whereas many anticlines in Wyoming and Colorado proved to be good producers, those in Utah seemed to be failures.

The salt anticlines in the Moab area are now known to be complex, so probably some of the wells drilled in and around them are not as meaningful as formerly believed. But it is not a very hopeful venture to drill a new well alongside an old one unless deeper, unexplored horizons are in sight of the bit. Deeper drilling is a possibility in some areas, but already the second and deeper round of drilling has taken place. In some structures there is no need to drill deeper because the hole bottomed in pre-Cambrian rock.

The three recently discovered fields in the Uinta basin have tapped accumulations in structures not evident at the surface. The structures were discovered by the seismograph and are so gentle and have so little closure that the oil may not have accumulated entirely due to anticlinal control.

This brings up another point which must temper our enthusiasm. It is that production from the base of the Green River formation is still a comparative unknown. Not enough wells have yet been drilled around the discovery wells to demonstrate how large the producing areas will be, and we are also still far from certain what the performance of the wells will be.

Conclusions

My conclusions in attempting to weigh the good and bad factors against each other are as follows:

1. There must be numerous, valuable accumulations of oil and gas in Utah hidden below the surface, but they are not going to be easy to find. For the most part they will be found by a careful integration of geophysical and geological work, and will be chiefly updip structures such as wedgeouts and unconformities.

2. Several more fields like Roosevelt and Duchesne will be discovered within the Uinta basin and the oil from this one large basin alone will be a great new influence on the economy of the Provo - Salt Lake - Ogden region in particular and of Utah in general.

3. Because of the difficulty in discovery the rate of discovery will be modest and, therefore, Utah will grow slowly as an imoprtant oil and gas-producing state; but it is already solidly in the picture, and its position will grow to one second only to Wyoming in the next decade.

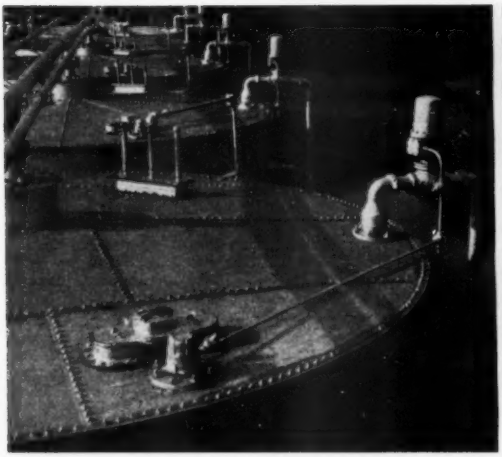

Fig. 1—A valve and a float switch are located on each tank in a battery being automatically controlled.

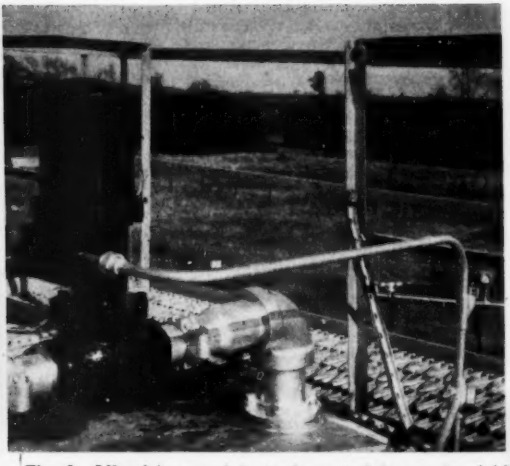

Fig. 2—All wiring used in tank control is run in rigid galvanized conduit sealed to exclude gas.

FOR IMPROVED EFFICIENCY . . .

Install Automatic Controls

on wells and tank batteries

Controls for tank-switching and for flowing and pumping wells increase efficiency of field operations

by Harry Pistole* and Bruce M. Sullivan*

THE primary purpose of automatic controls in the field is to increase the productivity of the lease pumper. His duties include several that are time-consuming, routine, manual operations which are readily adapted to automatic control. These duties include the following: (1) Flow wells for definite periods, (2) pump wells for definite periods, (3) "top out" lease stock tank, (4) switch tanks, (5) shut in lease production when equipment fails.

With these applications in mind, installations are justified to accomplish two basic functions. The first is filling of stock tanks with progressive topping out and switching from one tank to the next. The second is control of the daily flowing or pumping period of each well on the lease. The first function is common to all oil fields. However, the second is limited to fields in which it is necessary to stopcock many of the capable wells.

*Humble Oil & Refining Co., Tyler, Tex. Paper presented at the spring meeting of the southwestern district, American Petroleum Institute, Division of Production, Shreveport, March 5-7, 1952.

The efficiency of automatic equipment is reflected by the fact that pumper productivity has been doubled in many cases through its use. This gain in productivity is usually sufficient to pay out the initial investment in automatic equipment in 1 to 3 years, depending upon the size of the lease involved and whether the wells are pumping or flowing.

In addition to economy of operations, other benefits are realized from utilization of automatic controls. Production from leases which supply a central gasoline plant can be regulated to maintain a continuous flow of gas into the plant.

Wells can be scheduled for production on a 24-hour basis; that is, where all leases are not equipped for automatic operation, the leases which are so equipped can produce at night unattended, permitting the manually operated leases to produce during the daylight hours. It is thus possible for the pumpers to work during the period when their time can best be utilized in the over-all operation of the property. In some cases automatic equipment has also permitted pumpers to continue to work by eliminating duties that were beyond their physical capacity.

After the reliability of automatic equipment was demonstrated, application of automatic control equipment to wells and tank batteries progressed at a phenomenal rate in East Texas field. On January 1, 1952, 8 companies were operating a total of 36 tank batteries, 759 flowing wells, and 134 pumping wells controlled by automatic equipment. Equipment was on order or being installed on 31 additional batteries and 643 wells.

Electrically Powered Automatic Equipment

Tank-switching mechanisms.—Automatic operation of a tank battery is accomplished by the use of electrically operated valves, float switches, and a control panel or "switcher." On each tank is located a valve and a float switch, as shown in Fig. 1, while the control panel is located in the pumper's "doghouse."

When the oil reaches a predetermined height in the tank, the float

switch trips, actuating the switcher which closes the valve on the full tank and opens the valve on the next tank that is ready to receive oil. This process continues as long as there is a tank available for storage.

Selector switches are incorporated in the control panel to permit the pumper to isolate a tank that is being run to the pipe line or that is not to be filled for any other reason. Included in the panel is a relay which will stop production from all wells on the lease when there is no more storage space available at the battery, or when the fluid level in the separator reaches an abnormal height, which could result from malfunction of equipment or plugging of the dump line. Also, a prorating time clock is usually wired into the control circuit to automatically shut in the lease on nonproducing days.

The valves and switches used on the tanks are explosionproof as well as weatherproof. All wiring is run in rigid galvanized conduit equipped with sealing devices to exclude gas. Fig. 2 shows the conduit at the tank valve.

As the lease is operated unattended for 16 hours per day, a recording pressure gage is installed on the production header to give a record of the pressure fluctuations as the wells come on and go off. From this record any well that fails to produce, or is delayed in producing, can be detected and identified.

Other tank-battery accessories.—In conjunction with installation of automatic tank-battery equipment, devices have been tested which permit tank gaging and sampling from the ground level. A sample box can be installed on the side of a stock tank to enable oil samples to be obtained from the tank at a convenient ground level. The sample box has piping which extends to three different levels in the tank.

Valves on the piping enable a composite sample to be obtained by drawing equal volumes from each of the three levels. A diaphragm-type pump is provided in the box for returning the sample to the tank even when it is full or pressurized. Shakeouts of samples obtained from the sample box and of samples obtained by conventional thiefing have given almost identical results.

The ground level gaging device in Fig. 3 consists essentially of a foam-glass float which is located within the tank and connected to a graduated tape which extends through the top of the tank, passes over two pulleys, and down to a tape drum housing on the side of the tank. The housing is provided with a glass window and a pointer which indicates the feet and inches of oil in the tank. A method of calibrating the assembly is included. Plans are currently being completed to provide automatic recording of tank gages at predetermined time intervals.

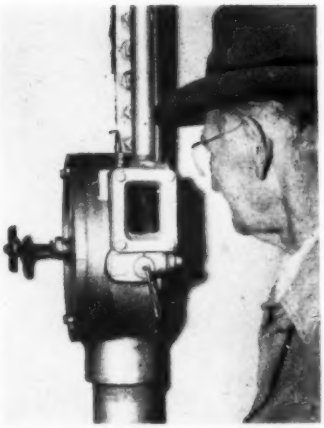

Fig. 3—Tank gaging may be done from the ground level by means of a graduated tape in a glass-windowed housing.

The tank-gaging devices have been proved accurate, checking against conventional gages; however, they have not been widely used throughout the East Texas field, as many pipe-line gagers consider it necessary to inspect the tank before and after the oil is run to determine the nature of paraffin deposition in the tank. In fields where tank-bottom deposits are no problem, use of the ground-level gaging and sampling devices should provide a reliable, convenient, and clean method of thiefing and gaging. In conjunction with other automatic tank-battery equipment, they will reduce the possibility of fire and hazards to personnel. In many cases definite economic saving can be realized by elimination of the conventional stairways and walkways.

Controls for flowing wells.—The control system for flowing leases consists essentially of an electric power distribution system, electrically operated valves to control the production of each well, and time clocks to operate these valves on a preset schedule. The distribution system includes a control wire which permits the panel at the battery to shut in all wells on the lease without cutting off power to the time clocks. The power requirements of the clocks and valves are small; however, where leases will ultimately be pumped with electric motors, conductors used in the distribution system are sized to carry the future pumping load.

Under certain conditions it may be found desirable to locate all valves and time clocks at the tank battery, thus eliminating the distribution system. This arrangement has proved very satisfactory in river-bottom areas that are subject to floods which might damage the control equipment or distribution lines.

Location of the valves at the battery is desirable on leases which will have a long flowing life, as the investment in an electric distribution system may be deferred until the wells are placed on the pump. Here, however, the governing factor is the condition of the flow lines as the entire line from the well to the battery will be subject to shut-in well pressure. Where flow lines are old and in a questionable condition, it is usually more economical to install a distribution system and locate the valves at the well rather than recondition the flow lines.

In addition to the normal requirements of a positive seal and reliable operation, valves used for automatic flowing control must be designed to close in the event of a power or control failure. Although several valves meet these requirements, only two types are in general usage at the present time. One type is an electro-hydraulic valve which contains a small electric-motor-driven pump that furnishes the operating force to open a single-seated globe valve. The other is a diaphragm type which is operated by well fluids and controlled by a solenoid-actuated pilot valve. Both valves are made in several sizes and can be equipped for the standard alternating-current voltages. Valves of 1-in. and $1\frac{1}{2}$-in. sizes with 110-volt operators are commonly used.

To control a flow valve located at the well, a time clock and a circuit breaker are usually mounted in a small weatherproof box. Pumping motor controllers, which contain a time clock and circuit protection, can be economically used on wells which are to be placed on the pump in a relatively short while, as some saving in labor and material can be realized when pumping is begun. The time clock at each well may be set to shut in the well on prorated days; however, it is usually more convenient to shut in the entire lease on nonproducing days with the prorating time clock at the tank battery. Use of this central control eliminates the need for changing the down days on the control clocks at the individual wells with changes in the number of producing days.

Controls for pumping wells.—Application of an automatic control system to electric-motor-driven rod-pump wells is simple and inexpensive. The magnetic motor controllers which are used to start and stop the units are normally equipped with time clocks so that the pumping period of the wells on a lease may be regulated to reduce the simultaneous power demand to a minimum. By connection of a control circuit to all of the motor controllers, the pumping lease can be controlled in the same manner as the flowing lease shutting in all wells when storage space is not available or when there is an equip-

ment or power failure at the battery.

Pneumatic controls.—The electrical system of control accomplishes the objective of automatic operation with a minimum of manual labor and a maximum of flexibility and reliability; however, there are other methods and types of equipment which will perform automatically or semiautomatically many of the functions of the electrical equipment. A pneumatic system of lease control has been designed for use where electric energy is not available or where gas engines are used for some other reason.

The tanks at the battery are equipped with diaphragm motor valves and liquid-level controllers which are interconnected by relay and pilot valves using the lease gas system as the source of power. The entire process of filling and switching tanks is similar to the operation of the electrical system previously discussed. Operation of the pilot valves permits selective filling of the tanks while a manual reset valve, which closes when the tank has been filled, prevents unintentional operating of the tank-inlet valve before the tank has been emptied.

By installing a diaphragm motor valve in the flow line of a flowing well and operating the valve by a pilot controller, the wells can be produced or shut in by changes in flow-line pressure. Low pressure, such as that caused by a flow-line break, will shut in the well; while high pressure, which could be caused by a closed flow-line valve at the tank-battery manifold, would also shut in the well.

A motor valve installed in the inlet line to the separator and operated by a liquid-level controller on the separator can be used to shut in the entire lease when no more storage is available at the battery or when some of the equipment at the battery does not function properly, causing an abnormally high fluid level in the separator. By application of a time-cycle controller, it is possible to produce and prorate flowing wells in the same manner that wells are controlled with electric time clocks.

Automatic operation of engine-driven pumping units is not as simple as operation of flowing wells or of electric-motor-driven pumping units. A pressure switch installed on the flow line can be used to shut down the engine when abnormally high or low flow-line pressures are encountered and a mechanical shutdown timer can be installed in the fuel or ignition system to relieve the pumper of the return trip to stop the unit; however, there is not at present any simple means of controlling the entire pumping period of engine-driven units, as satisfactory automatic operation of the engine starter has not been achieved.

Cost of automatic control equipment.—Automatic control equipment, either electric or pneumatic, can be purchased and installed on an average East Texas tank battery at a cost of approximately $700 per tank. A flowing well can be equipped with electric control equipment, exclusive of the electric distribution line, at a cost of about $225. The same well would require an expenditure of $400 when provided with pneumatic equipment, and additional expense would be required to supply control gas at the appropriate pressure to operate the devices.

A well that is being pumped electrically and already has clock control can be connected to a fully automatic lease-control system for about $35. In like manner, a well that is being pumped by a gas engine can be equipped with a pressure switch for shutdown only for approximately $70. When electric energy is readily available, the electric system of control for wells and tank batteries will usually require less investment than the pneumatic system; however, in many locations it may be found desirable to use pneumatic control devices for automatic lease operation.

Other types of controls.—Many combinations of tank battery and well-control equipment are now possible. By careful selection and application of automatic devices, the operator can obtain any degree of automatic operation desired on a lease. In some cases installation of a complete automatic system for control of the wells and tanks on a lease may not be economically justi-

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fiable, whereas the use of one or more of the automatic devices may be very beneficial in assisting the pumper to perform his duties.

Probably the simplest device for topping out and switching stock tanks is the overflow line. The manual operation of a battery equipped with overflow lines is not appreciably different from that of a conventional battery as the tank valves have to be opened and closed by hand; however, savings in pumpers' time are possible as it is not necessary for the pumper to be at the battery when a tank is filled and production begins to flow into another tank. The principle of the overflow line can be expanded into many combinations of piping and valves to permit almost any desired sequence of tank filling and switching. A common header with a valved connection to each tank is a typical arrangement.

There is now on the market a valve that accomplishes the operation of filling and switching stock tanks without a source of outside power. The operating force for the valve is furnished by a float and mechanical linkage. The valve installation is competitive in price and in operation to an installation of overflow lines. When the oil level in a tank equipped with this switching valve reaches a predetermined height, the float actuates the valve, thus closing off the inlet to the tank and permitting the next tank to be filled. The inlet to the full tank remains closed until the tank has been run, when it may be reset manually.

Neither overflow lines nor the switching valves are entirely automatic in their operation, nor do they in themselves provide any means for control of the wells which produce into the battery; but by application of additional float switches or pneumatic liquid-level controls, operation of the tank battery can be coordinated with automatic devices on the flowing or pumping wells of the lease.

A recent installation has been made and is now being tested in which overflow lines on the stock tanks are being used in conjunction with pneumatic liquid-level controls and a diaphragm motor valve on the flow-line manifold. This permits tank topping out and switching when the pumper is not on duty. In addition, a time-cycle controller permits the wells to be prorated and produced on a definite schedule.

Leases in the area where this equipment was installed are small, containing from one to seven wells which are normally controlled with stopcocks at the tank-battery manifold. A choke is installed in each flow line to regulate the rate of production. As each flow line has a check valve to prevent backflow of fluid from one well to another, it was possible to install one master shutoff valve on the header to shut in all wells on the lease simultaneously. This master valve is a diaphragm motor valve which is operated by the spring-driven, time-cycle controller on a preset schedule and by the liquid-level controller on the stock tanks when no more storage space is available at the battery.

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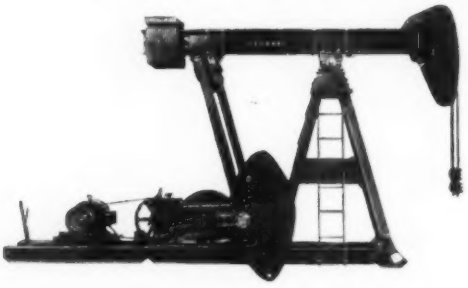

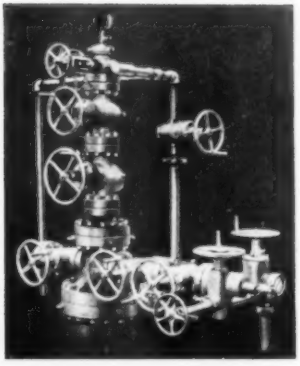

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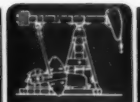

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Houdriforming's Role in Petroleum Refining

(Continued from page 79)

Yield-octane curves for debutanized Houdriformate from each of these stocks are shown as Figs. 2 to 6.

That Houdriforming results in effective desulfurization is clearly demonstrated in Table 13. The product, Houdriformate, recovered from operations at several operating severities contained, at most, 3.8 per cent of the sulfur originally present in the charge.

The aromatic content of the product is a function of the naphthene and aromatic content of the charge stocks; however, some paraffins are converted to aromatics. See Table 10 where the West Texas naphtha processed to 95 octane clear resulted in a net increase of 3 per cent over the theoretical maximum on considering all naphthenes as aromatic formers. The 96.9 research clear case on Table 8 illustrates a similar result.

The adaptability of the Houdriforming process to the production of aromatics is illustrated in Tables 14

and 15. For the results reported on Table 14, the stock charged was a 150°-220° F. cut with a total naphthene content of 51.2 vol. per cent split 18.5 per cent to benzene formers and 32.7 per cent to toluene formers. The total conversion of naphthenes to aromatics was approximately 90 per cent while at the same time, very little destruction of the paraffinic portion of the stock took place. As a result, high-purity hydrogen (about 98 per cent) was produced at the rate of 1,300 standard cubic feet per barrel of charge.

Table 15 illustrates the production of C_6 and C_7 aromatics from higher-boiling cuts. Here two stocks were processed, one containing 42 per cent naphthene, the other 61 per cent. Again it is evident that the naphthenes can be converted almost quantitatively to the corresponding aromatics. Again, loss of yield other than shrinkage, is low. Note that the aromatic fraction of these products, separated by distillation, gave F-4 + 4.6 cc. TEL per gallon performance numbers of 190 and 220.

TABLE 14 — HOUDRIFORMING A C_6-C_7 FRACTION FOR BENZENE AND TOLUENE PRODUCTION

Debutanized liquid, vol. per cent charge	89.3
C_4's, vol. per cent	2.6
Propane, wt. per cent	1.1
Ethane, wt. per cent	0.3
Methane, wt. per cent	0.2
Hydrogen, wt. per cent	2.7

Analysis: vol. per cent—	Charge	Debutanized liquid
Benzene	1.4	15.6
Toluene	4.6	31.7
Methylcyclopentane	4.6	2.8
Cyclohexane	13.9	0.8
Dimethylcyclopentanes	9.6	3.0
Methylcyclohexane	23.1	0.3
Olefins		0.9
Paraffins	42.8	43.1

TABLE 15 — HOUDRIFORMING C_6 FRACTIONS FOR AROMATICS PRODUCTION

C_3+ liquid, vol. per cent charge	91.1	87.1
C_4's, vol. per cent	1.8	3.6
Propane, wt. per cent	0.9	1.3
Ethane, wt. per cent	0.4	0.8
Methane, wt. per cent	0.2	0.8
Hydrogen, wt. per cent	2.1	2.2

Analysis: vol. %—	Charge	C_3+ liquid	Charge	C_3+ liquid
Toluene		5.4		2.5
C_8 Aromatics	1.9	30.3	8.0	40.9
C_9 Aromatics	1.1	5.1		18.4
Naphthenes	42	2.0	61	2.0
Olefins		2.0		2.0
Paraffins	55	55.2	31	34.2
F-1 Octane No.: (Total C_3+ liquid)				94.3
F-4 + 4.6cc. TEL aviation blending P. N. (aromatic portion)		190		220

Acknowledgment

The authors wish to acknowledge the assistance of members of the Houdry Laboratories in obtaining the pilot-plant data and the work of D. E. Morris in preparing the economic comparisons.

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2. Various Refinery Applications of Houdriflow Catalytic Cracking, G. F. Hornaday, H. D. Noll, C. C. Peavy, W. Weinrich. Presented at W.P.R.A. annual meeting at San Antonio, March 28-30, 1949 (The Oil and Gas Journal, April 7, 1949, p. 90).

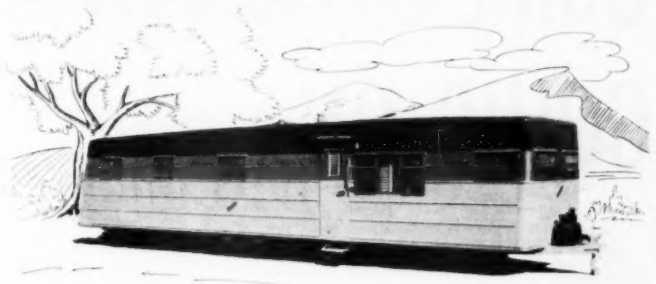
BOOKS

NOMOGRAPHY AND EMPIRICAL EQUATIONS. By Lee H. Johnson. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. 150 pp. $3.75.

In this volume the author explains two useful techniques for handling experimental and operational data: (1) nomographs, which provide quick, graphical answers where numerical data are substituted into formulas, and (2) empirical equations—mathematical expressions of data plotted in the form of curves. The reader is shown how to apply nomography and curve fitting to a wide variety of problems in science and engineering.

COMMUNICATION OF TECHNICAL INFORMATION. By Robert M. Dederich. Published by Chemonomics, Inc., 400 Madison Avenue, New York. Lithoprint, 116 pp. $5.

This book concerns itself with the fundamental principles of communication. It is not an outline for proper report writing. It does not concern itself with grammar, spelling, and punctuation. The author views the art of communication as the nerve system of an organization, with the technical man as an integral part, working not only at his specialty, but transmitting his ideas and results to other people. Written from the point of view of the business manager, methods of communication are evaluated with the following fundamentals in mind: (1) Why is the transfer of information necessary? (2) Who can use the information? and (3) How will the information be used?



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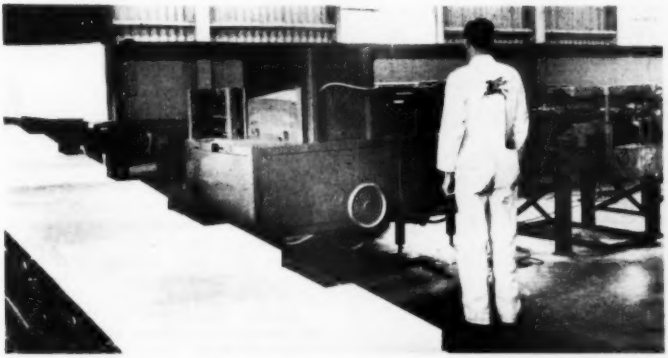


WAX-PACKAGING unit at Magnolia Petroleum Co.'s Beaumont, Tex., refinery loads wax cakes into cartons and seals them, making the plant completely automatic. At left of the operator is the magazine into which folded cartons are placed.

Automatic Packaging Unit

It provides "final touch" to new continuous wax-molding plant of Magnolia Petroleum at Beaumont, Tex., refinery

THE "final touch" has been given to the new wax-molding plant at Magnolia Petroleum Co.'s Beaumont, Tex., refinery with the addition of a specially designed packaging machine which automatically loads and seals the wax cakes in cartons and sends them by conveyors to box cars or storage.

The packaging equipment actually consists of four separate units, one of which accumulates the five cakes of wax which are loaded into each carton, one which forms the cartons for receiving the wax cakes, the gluing section, and the compression section. A series of conveyor belts are used for moving both the individual wax cakes and the filled cartons.

Individual cakes of wax are carried from the continuous-molding machine by belt conveyor and gravitate down a loading shute to the accumulator. There the cakes are moved both horizontally and vertically in a progressive stair-step method so that five cakes of wax are stacked together at one end of the accumulator, which is the loading chamber. A loading plunger then pushes the stack into a carton which has been simultaneously formed by the forming section of the machine.

Carton forming.—The carton-forming section is a standard-type machine used in most commercial plants where cartons are automatically loaded. Flat cartons are stacked in a knocked-down position in the magazine. The machine takes one carton from the bottom of the magazine, opens it up, folds the flaps in on one end, and positions the carton to receive the stack of five cakes of wax, which are pushed into the opened end of the carton by the accumulator.

Gluing.—When the wax has been loaded into the carton, the gluing machine is tripped, advancing the filled carton through the gluing machine where the flaps are opened, glued, and closed. The filled carton is then moved to the compression unit where a 2-minute holdover time is allowed for the glue to set.

Next, a marking conveyor is used for stamping the loading code numbers and grades on the outside of the cartons. A loading belt then carries the cartons to a boxcar or storage.

The packaging equipment has a loading capacity of five 55-lb. cartons a minute.

The unit was designed and built for the wax plant by J. L. Ferguson Co., which adapted its standard carton-forming, gluing, and compression unit — and built the accumulator-loader—to meet the specific requirements of the wax plant.

Putting Foam Chambers on Storage Tanks is Simplified

Installation of foam chambers on storage tanks is now being accomplished without the use of internal scaffolding and its attendant awkwardness.

The new procedure requires the welding of two steel clips to the side of the tank just below the spot selected for the foam chamber. The clips are attached by boilermakers and welders working from the roof of the tank.

Small bracket-type scaffold supports are next attached to the steel clips and heavy boards placed across the supports then make up the scaffold.

Working from the external scaffolding, crew men cut a round hole in the side of the tank at the proper location to fit the outlet pipe on the foam chamber. A rectangular hole is also cut in the roof of the tank.

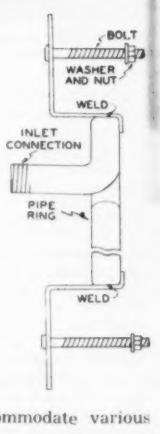
The internal-baffle section is lowered into the tank through the rectangular hole and the baffle flange is guided into position with reach rods and is welded to the tank wall. A welder is able to accomplish this by sitting on the external scaffold and reaching through the round hole in the side of the tank.

Once the baffle has been permanently attached, the outside mixing chamber is welded on, the hole in the roof patched, and the workers may then proceed to the next foam chamber location.

The method was suggested by Arthur F. Cook, boilermaker's helper at the Esso Standard Oil Co., Baton Rouge, La., refinery.

Extension Brackets Hold Steam Jet in Manholes

A steam jet or exhauster may be attached securely to manholes of various sizes by use of extension brackets. The brackets are fastened through the manway flange bolt-holes and the jet thus positioned at proper location.



The brackets are made of steel bars bent at one end to fit the contour of the jet pipe-ring with a slot of suitable length cut into it to accommodate various sizes of manholes.

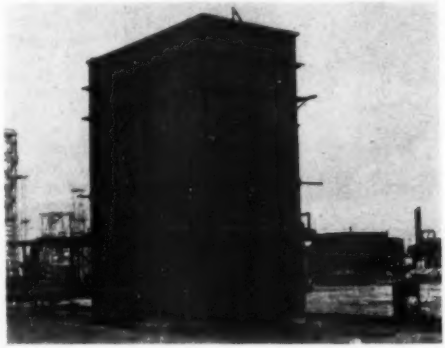
The two brackets are welded at opposite points on the pipe-ring. Bolts are inserted in the slots for holding the syphon on the manhole flange. A nut with a welded-on washer is used to bolt up the brackets by Sinclair Refining Co., Houston.

Waste-Gas Burner

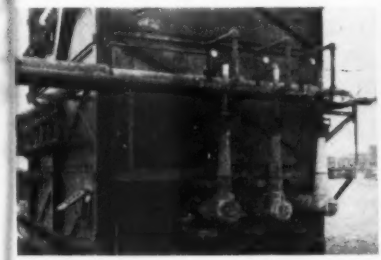
Aurora Gasoline Co. develops enclosed burner which replaces open pit formerly used at Detroit refinery

AURORA GASOLINE Co., of Detroit, which operates a refinery south of the city, has experimented with waste-gas burning, and has developed an enclosed burner which has replaced an open pit formerly used for this purpose.

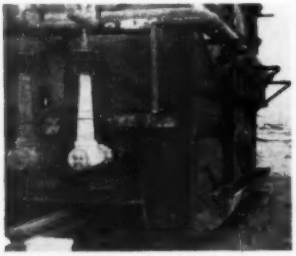
The burner in outward appearance resembles a water-tube boiler, with the supporting structure and the casing of steel. It is lined throughout with refractories simliar to that employed in boiler plants and and oil heating furnaces. The entire top of the structure is open for the escape of the products of combustion, rather than using a stack, since no draft is required to operate the burners and air-gas mixers.



WASTE-GAS burner operated at Detroit by Aurora Gasoline Co., which replaces open pit.



BURNERS installed in waste-gas-combustion chamber at the Aurora refinery.



ADDITIONAL DUCTS for air provide complete combustion.

Burners.—Three "National" air-oil burners are installed in one end of the structure through which the normal volume of gas passes for burning. Eight extra gas-feeder nipples are inserted in each side to handle an overload.

Since it is the desire of the company to dispose of the gas with no smoke or fumes, excess air is fed into the combustion chamber through four ducts on each side, installed at approximately ground level.

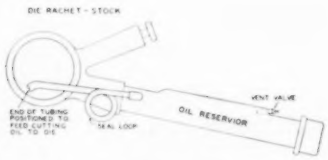
Two obvious advantages of this type of burner are (1) combustion being carried on inside a steel housing lined with refractories prevent radiation of heat which could cause injury to men who must work in the vicinity, and (2) the structure having an open top better than 20 ft. from the ground assures that the products of combustion will be dissipated into the upper air of the site.

Method for Oiling Ratchet Dies Extends Their Life

Hand-operated pipe-threading dies fitted with a handle-reservoir for storing cutting oil and a feeder mechanism is said to extend die-served life and to produce higher-quality threads than obtained by conventional methods by Sinclair Refining Co., Houston.

Cutting oil is fed to the dies in small amounts rather than in the larger quantities normally supplied by usual methods.

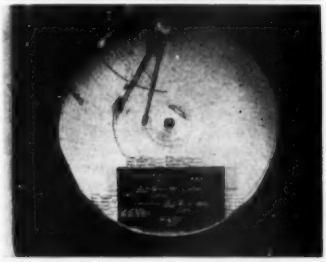
The oil reservoir consists of a 1½-in. standard pipe which also serves as the handle. The reservoir-handle which holds a 2 to 3-day supply of oil is reduced at one end and threaded

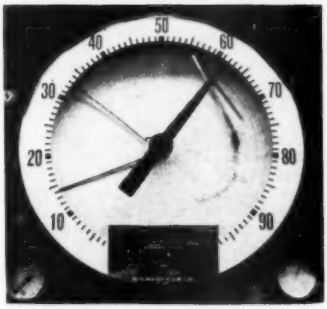


to make up into the ratches type die holder. At this end a length of copper tubing is connected to the reservoir and is then looped once before ending at the die. This tubing carries oil from the reservoir to the die, the loop serving as seal.

At the upper end of the handle the reservoir is again swaged and a standard ¾-in. pipe cap closes the opening through which the chamber is refilled.

A small depression-type valve is installed at a point on the curve of the swaged portion of the reservoir-handle. When pressed open this vent valve allows oil in the reservoir to flow by gravity through the copper tubing on to the die.





Aid to Operators

Portions of flow diagrams showing particular equipment served by the instrument in question have been pasted on the inside of glass covers on instrument-panel boards in control rooms at Phillips Oil Co.'s Sweeny, Tex., refinery. The miniature flow sheets pinpoint the instruments plus auxiliary equipment used in the particular segment of the process served by the instrument.

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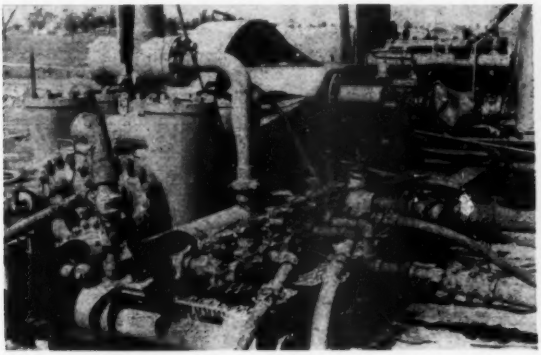


MUD MANIFOLD.—Distribution manifold on base of pump is not dismantled during moving operations.

SUPPORTING STRUCTURE.—Structure for engines is built as a shallow frame.

Rig Features Save Time

Ideas incorporated in McAteer Drilling's mast-type rig were designed to save time in tearing down, rigging up

A MAST-TYPE drilling rig operated by McAteer Drilling Co. in Rosecrans field south of Los Angeles incorporates a number of features which have been designed to consolidate equipment and provide means of tearing down and rigging up with a minimum of lost time.

A mud-distribution manifold was designed to rest on the platform beside the pump so that it remains permanently in position when operating or when the rig is moved. The discharge line is attached to a long header containing distribution-line outlets. The main line to the derrick standpipe leaves at one of the connections.

Most of the piping begins with flexible rubber lines. The exception is the relief line through which mud flows when the pressure exceeds that handled by the shear pin in the relief valve. This line is a rigid pipe but is fitted with full swings for ease of positioning.

All valves and connection fittings are placed near the header to prevent overhang of the controls.

Torque converter.—The engine is equipped with a torque converter. The problem of cooling the oil in this unit was solved by attaching auxiliary coolers in front of the engine radiator. The cooling panels were attached to the engine-radiator housing at the bottom of the cooling unit so that air is drawn through the oil coolers without hindering cooling of the jacket circulation water.

Oil is led through piping and flexible oil-proof hose from the converter to the cooling units, and back again to the converter through similar connections. This attachment is permanent and does not interfere with engine maintenance or moving from well to well.

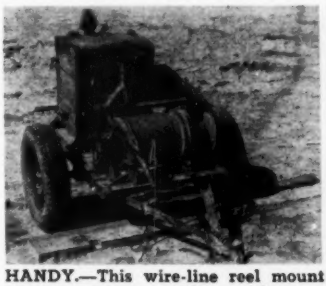
Engine mounts.—At the rig itself, the drilling engines are mounted on a shallow platform. The two outside sills are wide channel iron selected to reduce the over-all weight but to provide adequate strength to handle the loads imposed upon them.

The platform is supported at the mast end by the structure there, while the two center supports are pipes fitted with screw jacks to provide adjustment for uneven height. These pipes have wide steel bases and two diagonal braces to prevent side movement.

The extreme end of this structure is provided with the sand line hoist and auxiliary engine, and is attached to the main structure with dowel pins and slip joints.

The outer end of the extension is supported with a two-post stand, hinged at the top for folding when moving. Each post is equipped with a screw-jack head at the base for height adjustment.

"On the Job," this new exclusive feature of The Oil and Gas Journal, is designed for YOU! You've probably already read something which has been a big help to you on your own job, and you've probably got an idea which may "click" with resultant savings either in money, time, or easier work.



HANDY.—This wire-line reel mount is powered by a gasoline engine.

Wire-Line Reel Mount Is Operated by Gasoline Motor

K. L. Kellogg & Sons Drilling Co. supplies a wire-line reel mount which is operated by a small gasoline engine.

The reel, engine, and drive are all set on a small two-wheeled trailer equipped with a hitch for pulling behind an oil country pick-up truck.

The unit can be spotted at the end of the walk between the pipe rack, or at the side of the derrick, whichever is most convenient.

The frame supporting the unit is a more-or-less conventional skid-type foundation which can be removed from the 'chassis' by removing U-bolt clips which retain it to the axle of the trailer. Two common 6.00 by 16 wheels are used, carrying pneumatic tires. The hitch is the conventional V-type carrying the clamp for the ball on the pickup bumper.

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THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

MACHINE OPERATORS.—Stanolind Oil & Gas Co. depends on women workers in many skilled operations. These key-punch operators work in the tabulating-machine section of the accounting department at Tulsa.

Women Fill Important Oil Jobs

THE oil industry has many women working throughout its far-flung operations.

Not only are women filling many important clerical posts, but they also hold jobs as geologists, chemists, geophysicists, draftsmen, and engineers.

An example of how women fit into the petroleum industry is that Stanolind Oil & Gas Co., Tulsa, now has 1,002 women on its payroll. These women fill the every-day secretarial duties as stenographers, telephone operators, receptionists, key-punch operators, teletypists, librarians, and bookkeepers, as well as the more technical positions.

While the nature of the oil business is such that most field and many office operations are not suitable for women, they efficiently perform an increasing number of essential jobs, including technical positions such as those of geologist, chemists, engineers, and geophysicists.

A trend.—Two world wars contributed toward the trend of more women in industry. As a matter of fact, Stanolind surveyed the possibility of putting women in the field to assist pumpers, but World War II ended without this step becoming necessary.

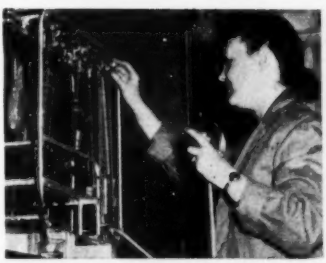
But had the war continued much longer, "Rossie the Riveter" might have had a sister, "Priscilla the Pumper," working out on the lease.

The company states that women today fill their positions because they have the ability and performance, and their employment is not due to any manpower shortage.

They do a good job, and the company states it can't get along without them.

GEOLOGIST.—At Wichita, Shirley Lenderman is among the few women geologists who work for Stanolind.

DRAFTSMAN.—Mildred Rogers of Casper, Wyo., is among the women who draw complex maps and charts.



CHEMIST.—At Stanolind's Elk Basin plant Barbara Smalley, junior chemist, must solve analysis problems.

COMPUTER.—Robbie Rutherford of Fort Worth is an office computer, figures data for geophysical-review section.

ENGINEER.—Marthann Kessler, junior research engineer, logs core samples. She is at the Tulsa research laboratory.

GEOPHYSICIST.—Dorotha Green of Houston uses a variety of skills as a junior geophysicist for Stanolind Oil & Gas Co.

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THE JOURNAL'S WEEKLY
Engineering Reference
SECTION

No. 4

PUMPS:

Part 4—Pumping Volatile Liquids

by Gerald L. Farrar
Engineering Editor

PREVIOUS units on pumping volatile liquids have been devoted to suction requirements, required design features, and operating factors. Packing and sealing factors are considered in this installment.

Seals and Packing

Pumps in volatile-liquid service may be equipped with packing or, in the case of centrifugal pumps, with mechanical seals. Lubrication of some sort is usually required, regardless of the type used. In most cases the lubricant is so-called "seal oil."

With modern design of reciprocating pumps for volatile-liquid service (previously discussed), few packing problems are encountered. Those that exist are easily solved by using simple sealing arrangements.

On the other hand, packing problems abound in the use of centrifugal pumps. Most of the discussion of **seals and packing** applies to these units.

Sealing arrangements.—Four sealing methods are commonly used for pumps handling volatile liquids:

1. Several compressible packing rings are inserted in the packing space. They are divided into two sections by a lantern ring. Lubricant is introduced through the lantern ring at or near the center of the packing space. This method is the one most often used for reciprocating pumps.

2. Compressible packing rings are used in conjunction with a lantern ring, as in (1). In addition, a special connection is made at the inner end of the packing box. This connection permits either the bleeding out of liquid from the pump, or injection of a different liquid from outside, so that packing rings will not be in contact with the pumped liquid.

3. Single mechanical seal consists of two rings with highly polished faces, one stationary and the other rotating. The faces are brought into sliding contact under sufficient pressure to prevent the escape of fluid.

4. Double mechanical seal consists of two standard seals, as in (3), combined in one stuffing box. Sealing oil is injected between the seals at a pressure slightly in excess of pressure at the stuffing-box throat. This prevents pumped liquid from leaking through the seal, since any leakage is into the pump.

Lantern rings.—The use of lantern rings without the inner flushing connection (Fig. 1) is usually successful if specific gravity of the liquid pumped is not too low, i.e., about 0.60, under the pumping conditions. Light-ends pumping with this packing arrangement is therefore not usually successful.

Pumping of hot oil may be accomplished successfully with this setup, particularly if seal oil is circulated through the lantern ring rather than being "deadended" to it. Circulation will insure good lubrication, since flow may be checked by any one of several measuring devices. Also the circulating oil cools the packing and prevents overheating. Packing lasts longer and is more efficient when cooled in this manner than when water-cooled alone.

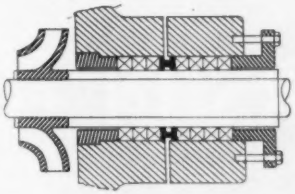

Fig. 1—Several packing rings with a lantern ring constitute a solution for some packing problems. Preferably, oil is circulated around the lantern ring.

Seal oil for use with lantern rings may be lubricating oil, gas oil, or comparable hydrocarbon fractions. The most common method of handling the oil is by an oil-pressure unit. The oil is stored in a reservoir and transferred to the various packing systems by means of a special pump.

Depending on the nature of the process, seal-oil pressure may be slightly higher than the pressure on the pumped liquid, in which case a small quantity of seal oil enters the process stream. Or the seal-oil pressure may be lower than pumped liquid pressure. In this case the seal oil is continually being diluted by small amounts of process liquid.

Flushing connection. — When liquid of low specific gravity is being pumped, or when extraordinarily high pressures are encountered, the flushing connection may be used in connection with the lantern ring. Packing life and efficiency are increased by this procedure. However, there are disadvantages whether bleeding or injecting liquid.

When bleeding liquid, as much as several gallons per minute of material must be removed from the system. This amounts to significant material loss unless adequate receiving facilities are provided. Gasification sometimes occurs, thus aggravating the problem.

When injecting liquid, the process stream is continuously contaminated with seal oil, and equivalent seal-oil makeup must be provided.

Although these objections are not prohibitive, the use of mechanical seals is usually indicated, if the simple lantern-ring arrangement is not sufficient.

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A Compact Mud System

THE driller is often called on to carry out his operations in areas where space is at a premium.

Driller Gene Reid encountered this problem in the area east of Whittier, Calif., on a lease for Universal Consolidated Oil Co. Faced with the problem of drilling in citrus groves, the mud system was redesigned to fit into a very small space.

Two tanks were built to handle the mud; one directly under the shakers. Here the flow pipe is led from the rig so that separation of shale from the fluid is easily obtained.

The screened mud flows through the shakers into an extended flume leading in the opposite direction of normal flow. Adequate turbulence is thus obtained without extensive use of guns and mechanical stirring devices.

The apron of the shakers extends outward to a rather small shale pit, which is a rectangular steel tank. This tank is located beside an access road to provide means of pumping refuse into vacuum trucks. The tank is built with a bottom deck sloping slightly towards one corner so that shale can easily be washed to the inlet hose when removing refuse with vacuum.

The main tank to which the connections of the circulating pumps are attached is also connected to the primary tank beneath the shakers. A single removable line connects these two vessels and the flow may be shut off by closing a gate valve in this line.

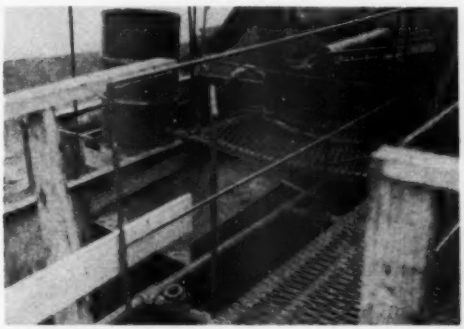
The fluid feeds by gravity from the primary tank to the suction pit. Long flumes, or mud ditches, are avoided because of the small area on which the standard derrick is located.

On a small platform beside the shaker is the chemical tank where additives are mixed and introduced into the mud stream immediately after passing through the screens. These chemicals join the circulation stream almost at the inlet of the extended flume below the shakers. Thorough mixing is obtained when the mud falls from the lip of the flume, and while mud is flowing through the connecting piping between the two main mud tanks.

Dry mud is mixed on a small landing built against the end of the suction tank. A slurry of this material is added directly to the tank at the suction of the pumps. Immediate results can thus be obtained when changing the characteristics of the circulation.

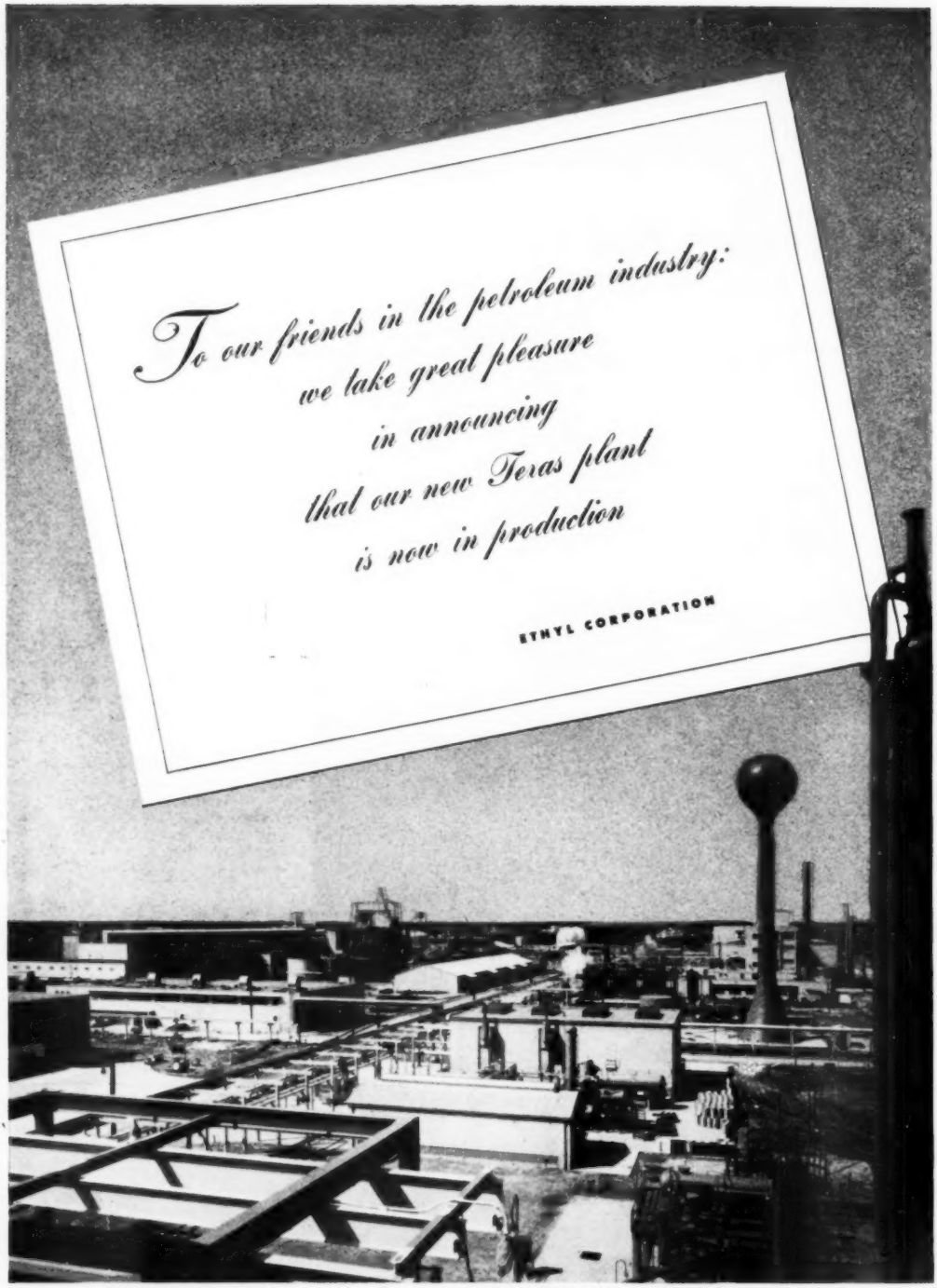
Reduction in size of the tanks and judicious arrangement provide for an operation utilizing minimum space.

Compact mud system designed particularly for drilling in restricted areas. Staggering of equipment at different levels conserves space.



Shakers mounted above end of mud tank. Flume carries fluid to opposite end of apparatus.

Dry-mud mixer installed on timber platform. Discharge is into pump suction tank.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QUESTIONS ON TECHNOLOGY

by W. L. Nelson
Technical Editor

This department was created for the purpose of aiding managers, superintendents, engineers, chemists, and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Crank-Case Dilution By Viscosity Change

Is there a chart or equation available whereby the per cent of gasoline dilution in a used oil can be estimated from the viscosities at 100° F. of the new and used oils? D.J.A.

No such charts or equations are known to this department, but it would seem that an empirical relationship could be established that would be of some value. The A.S.T.M. Viscosity Temperature Chart (D341 of Petroleum Products and Lubricants, 1916 Race Street, Philadelphia) could be used for estimating the composition of blends. Chart D, Kinematic Viscosity, Low Range, extends down to a viscosity of 0.4, and most gasolines have a viscosity at 100° F., in the range of 0.4-0.6.

Viscosity blending charts are not entirely accurate when applied to stocks whose viscosities differ greatly. In addition, the thinning of crankcase oils during service is not caused entirely by gasoline dilution. However, if only a gross approximation or a quick means of comparison is desired, then the proposed blending method might be employed. Its accuracy could be improved by looking up the viscosities of a few crankcase oils, in the literature. Many tests have been made of the changes in the properties of oils during service.

Octane Number of Iranian And Other Gasolines

What is the octane number of the gasoline in Iranian crude oils and how does it compare with the octane numbers of other gasolines? S.M.T.

The octane number of Iranian or Middle East gasoline is low, generally 36-44 by the motor method for a 400 end-point product. This is only a little lower than would be expected of gasolines of such a paraffinic nature (Characterization Factor of 12-12.2). Gasolines from United States crude oils such as Rodessa, Pennsylvania, Mississippi, etc., have similar octane numbers. None of these gasolines is high in sulfur (even the Middle East gasolines), and high-sulfur gasolines of the same characterization factor such as those from some high-gravity West Texas crude oils are even lower.

In general, the octane numbers of the crude oils that compete for the world market are about as shown in Tables 1 and 2.

Although no accurate or specific relationship between octane number and any other easily obtained physical property or factor has been discovered, the general relationship can be easily ascertained. Table 3 is such a relationship. It shows the general and most approximate relationship between characterization factor (of gasoline) and the octane number of 400° F. end point — 10-lb. R.v.p. straight-run gasolines. Note particularly, however, that enormous variations occur, that the data underlying Table 3 exhibit variations of at least plus or minus 25 per cent.

Consideration of all octane number data available (400°-300° e.p.—unleaded—leaded), indicate that the relative octane numbers of world competitive crude oils are about (based on Venezuelan gasolines as 1.0) as shown below:

California	1.03
Venezuela	1.0
East Texas	0.95
West Texas	0.87
Middle East and Mississippi	0.77

Table 3—Average (approximately) Relationship Between Octane Number and Characterization Factor of 400 E.P.—10 R.v.p. Straighrun Gasolines

Characterization Factor of Gasoline	Octane Number (M.M. clear)
11.4	67.0
11.5	66.0
11.6	64.5
11.7	62.5
11.8	62.5
11.9	60.0
12.0	49.0
12.1	41.5
12.2	35.5
12.3	31.0

TABLE 1—OCTANE NUMBERS OF LEADED (3 cc. TEL) 400° F. GASOLINES (M.M.)*

A.P.I. of crude	Average Venezuelan	Average Mississippi	Average West Texas	Average Middle East	Average East Texas
12	79	....	....	....	....
16	81	60.5	....	....	....
20	79	64.0	....	....	....
24	78	65.0	72.0	....	....
28	75	....	62.0	62.5	....
32	78	....	68.5	62.7	....
36	79	....	65.0	62.0	....
40	80	....	56.0	61.9	78.0
44	81	....	....	....	....
48	80	....	....	....	....
52	82	....	....	....	....

*Averages of many gasolines from crude oils in each gravity range.

TABLE 2—OCTANE NUMBERS OF 400° F. CUTS of UNLEADED GASOLINE (M.M.)†

A.P.I. of crude	Average Venezuelan	Average Californian	Average Mississippi	Average West Texas	Average Middle East	Average East Texas
12	62	67.0	....	....	....	....
16	64	64.5	33.0	....	38.0*	....
20	60	63	38.8	....	....	....
24	56	61	42	58.0	....	....
28	53	....	39.5	45.0	....	....
32	56	....	....	54.0	39.5	....
36	59	58.0*	....	49.5	40	54.0
40	60	....	....	37.0	39.5	57
44	62	....	....	....	....	....
48	61	....	....	....	....	....
52	63	....	....	....	....	....

*Not average crude oils. †Averages of many gasolines from each range of crude-oil gravity.

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CORROSION CONTROL

Crude Lines, Products Lines, Tankers

PIPE-LINE companies do not usually experience interior corrosion on trunk lines handling sour crude. The difficulty is usually on the gathering systems. Considering all factors and conditions involved, it is apparent that where a certain velocity of oil movement is maintained in the pipe interior corrosion is not a problem.

In a gravity system, where flow is not so rapid, interior corrosion does occur. In such lines water settles out and remains in the low places. Free sulfur and hydrogen sulfide in the crude oil then react with the water to form a corrosive compound.

In West Texas area gathering systems, a number of possible solutions have been tried, one of which is the use of cement-lined pipe. In some cases the pipe has been lined with cement joint by joint. This has had some success from various reports received, but is expensive.

Incidentally, cement lining of pipe has proved worth while in refineries particularly on running lines from stills to tanks. Some of these pipes have been in operation for approximately 10 years.

Some companies have used cement-lined pipe in salt-water disposal lines, this being the only thing which will stand up other than some asbestos linings.

It has been reported that some companies are trying powdered zinc dust as an inhibitor. While originally considered satisfactory, later comments indicate that it is not working out too well.

Another type of interior coating now being used to some extent is a plastic resin which is applied in place.[1] This method consists essentially of two cooperating plugs which are moved back and forth in an underground pipe line by means of compressed air. In operation, a cleaning fluid is placed between the two plugs and when the plugs are moved back and forth the inside surfaces of the pipe are cleaned. After the cleaning operation is completed, the plastic coating is then placed between the plugs and the process repeated. In that manner a coating is placed on the inner surfaces of the pipe.

FINISHED PRODUCTS LINE CORROSION—INTERIOR

Gasoline as received from the refinery is, in general saturated with both water and oxygen due to the final methods of treatment. In addition to the dissolved water, a certain amount of entrained water may be carried to tankage.

The chemical reaction for rust formations [$2Fe + O_2 + 2H_2O = 2Fe(OH)_2$] indicates that 100 lb. of water will react with 310 lb. of iron, in the presence of oxygen. Since a unit volume of iron will yield about 20 to 30 volumes of rust, a rust scale 1/10-in. thick can be expected to form uniformly over the inner surface of the pipe each year, under the most adverse conditions.

The experiences of numerous operators, however, have indicated that corrosion rates and total corrosion are most severe at the point where the gasoline is originally introduced into the pipe line. Thus a thicker scale will be formed in the first portion of the line, which must eventually be removed from the line to maintain throughput.

First evidence of corrosion is usually a decrease in throughput due to a decrease in "C" factor, wall roughness, discoloration of the product, stuck gate valves, damaged metering equipment, excessive wear on packing glands and pumping equipment. These problems are immediately reflected as increased operating costs due to excessive shutdown time, maintenance, and product contamination.

TANKER CORROSION—INTERIOR

Generally speaking, no successful protective coating for the interior of cargo tanks on deep-sea tankers has been found. While the problem has always been a serious one in the carriage of refined oil, it is not quite so serious in the carriage of crude oil, except when a high sulfur content is present at which time the introduction of salt-water ballast causes excessive pitting on the bottom shell plating of the crude-oil carrier.

Dehumidification.—Several companies are now experimenting with the introduction of dehumidified air into the tank spaces. This process is accomplished by passing preheated air over silica-gel beds; such air is then introduced into the tank spaces through the filling line, until finally one has a tank of low humidity.

A vessel examined after operation for 9 months, had the dehumidified air entering a wing tank while the opposite wing tank was used as a check. All the heavy scale had flaked off, and 112 buckets of scale were removed from the tank as against 3 buckets of scale in the opposite tank space. Furthermore, no signs of fresh scale were observed in the dehumidified space.

Inhibitors.—Recently the use of polar-type inhibitors, soluble in the gasoline, has been suggested. After 6 months' trial in an oceangoing tanker, using a dosage of 12 lb. per 1,000 bbl. of a commercial inhibitor, the results are promising. Less visible rust is being formed on clean steel and less rust is being removed from the bottom of the tanks. Although this method will not give complete protection against corrosion, it appears definitely to be attractive. Further tests will be made before the overall economics can be determined.

Galvanic protection.—Use of a multiplicity of anodes suspended in the gasoline cargo tanks has been tried with some degree of success. The galvanic currents generated when in contact with seawater ballast result in protection through rendering the steel plates cathodic. The limitations appear to be in the large number of suspended anodes required, the difficulty in keeping the anodes suspended at the proper point in rough weather, and in replacement costs for the expendable anodes.

Reference

1. "New Method of Cleaning and Coating Pipe Lines in Place," The Oil and Gas Journal, October 4, 1951, p. 293.

Part 52 of a series by Marshall E. Parker, consulting engineer, Houston.

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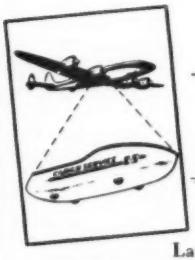

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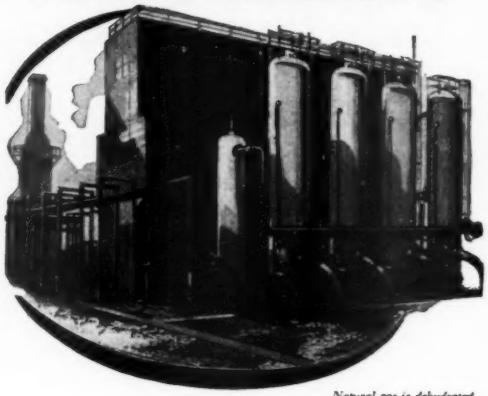

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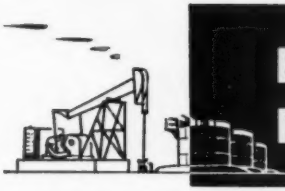


How to Select Transmission Belts—2

IN the preceding installment a table of service factors was given for various service. Use of the service factor with the figure and tables presented here will enable rapid belt selection.

The horsepower capacity chart (Fig. 1) has been prepared by Newell Perry, Thermoid Co. Used to determine **horsepower delivered per inch per ply of belting,** this formula is based on Equation 1:

$$hp = \frac{S\,(T_1 - T_c)\,(1 - 1/R)}{33{,}000} \quad (1)$$

hp = horsepower capacity per ply

T_1 = proper tight side tension for fabric involved in lbs.

T_c = centrifugal tension in lbs.

$$= \frac{w\,S^2}{3{,}600\,g}$$

R = ratio of tight side to slack side tension

$$= e^{ab} = \frac{T_1 - T_c}{T_2 - T_c}$$

W = 0.03 lb., the average weight of belting per inch per ply per foot

TABLE 1—WELL-PROPORTIONED RUBBER BELTING

Standard belt-width (in.)—	Min. plies	WP value	Intermediate plies	WP value	Intermediate plies	WP value	Max. plies	WP value
2	3	6					4	8
3	3	9	4	12			5	15
4	3	12	4	16			5	20
5	4	20					5	25
6	4	24	5	30			6	36
8	4	32	5	40			6	48
10	4	40	5	50			6	60
12	5	60	6	72			7	84
14	5	70	6	84			7	98
16	5	80	6	96			7	112
18	5	90	6	108	7	126	8	144
20	5	100	6	120	7	140	8	160
22	5	110	6	132	7	154	8	176
24	6	144	7	168			8	192
26	6	156	7	182	8	208	9	234
28	6	168	7	196	8	224	9	252
30	7	210	8	240	9	270	10	300
36	7	252	8	288	9	324	10	360
42	7	294	8	336	9	378	10	420
48	7	336	8	384	9	432		
48			10	480	11	528	12	576

S = belt speed in feet per minute

g = the acceleration of gravity, 32.2 ft. per second per second

e = base of Naperian logarithm = 2.71828

a = coefficient of belt-pulley friction = 0.22 at 180°

b = angle of belt contact in radians

T_2 = slack side tension

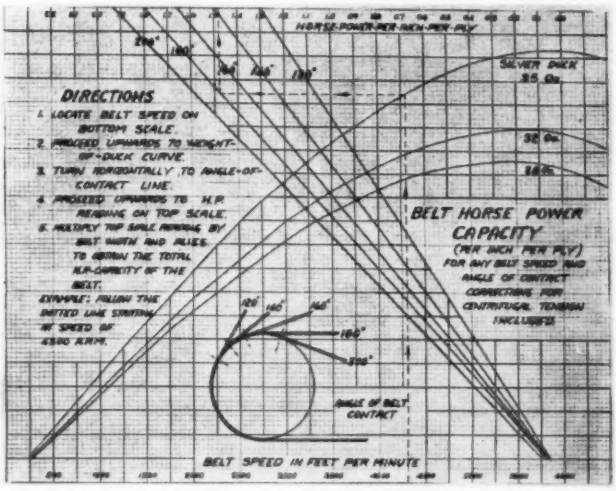

HORSE-POWER PER INCH PER PLY
DIRECTIONS
1. LOCATE BELT SPEED ON BOTTOM SCALE.
2. PROCEED UPWARDS TO WEIGHT-OF-DUCK CURVE.
3. TURN HORIZONTALLY TO ANGLE-OF-CONTACT LINE.
4. PROCEED UPWARDS TO H.P. READING ON TOP SCALE.
5. MULTIPLY TOP SCALE READING BY BELT WIDTH AND PLIES TO OBTAIN THE TOTAL H.P. CAPACITY OF THE BELT.
EXAMPLE: FOLLOW THE DOTTED LINE STARTING AT SPEED OF 4500 R.P.M.
SILVER DUCK 35 Oz.
32 Oz.
28 Oz.
BELT HORSE POWER CAPACITY
(PER INCH PER PLY)
FOR ANY BELT SPEED AND ANGLE OF CONTACT
CORRECTING FOR CENTRIFUGAL TENSION INCLUDED
ANGLE OF BELT CONTACT
BELT SPEED IN FEET PER MINUTE

Fig. 1.

A belt with the proper WP product should also be in good proportion according to Table 1. Finally, Table 2 should be consulted to assure flexibility. These considerations, properly coordinated, will dictate the selection of the actual belt width and the corresponding number of plies required by the WP product.

Special care should be taken to see that pulley diameters are not too small (Table 2).

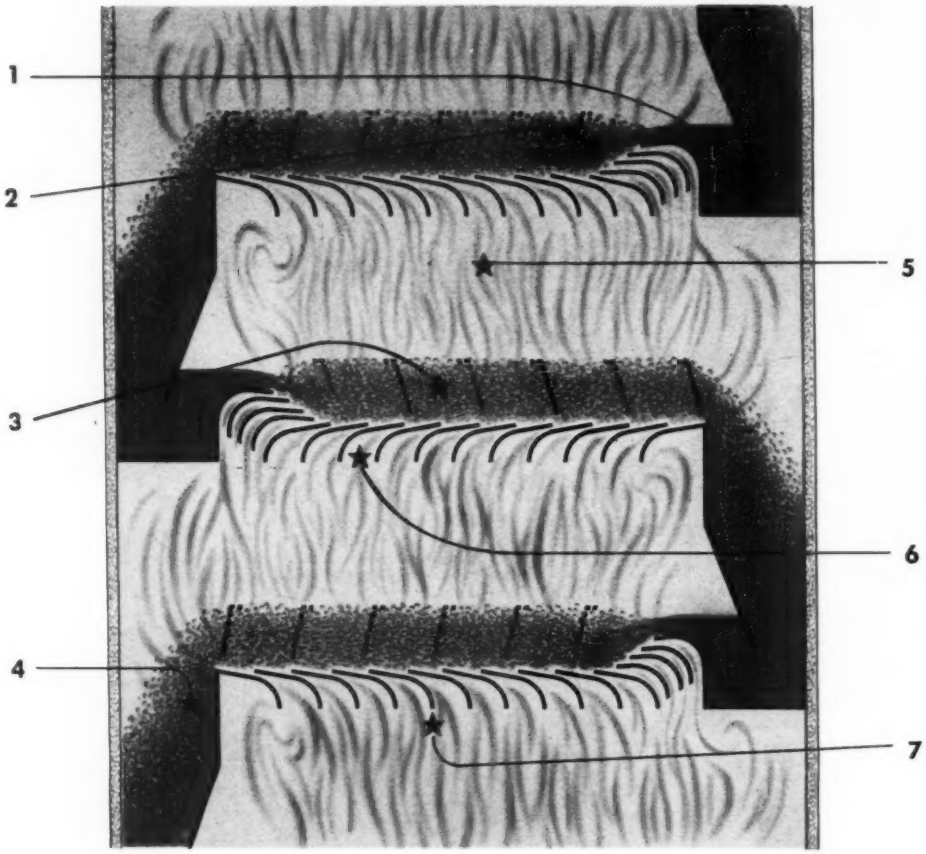
TABLE 2—PULLEY DIAMETERS VS. BELT PLIES

Rubber belt fabric weights—	Silver 35-oz. hard duck		28 and 32-oz. soft duck	
	Pulley diameters in inches			
No. of plies	Min.	Normal	Min.	Normal
3	4	7	4	6
4	6	9	6	8
5	8	12	8	10
6	10	15	10	14
7	12	18	12	16
8	14	22	14	20
9	16	26	16	24
10	18	30	18	28

Note: Use normal diameters for best results. Pulleys larger than normal may be used.

Contributed by Harry W. Smith, Inc., New York

Guarantee 30% . . . than Conventional Bubble Trays



1. Conventional settling time is used to obtain dense liquid phase entering Kaskade. Bubble trays need more vertical height of dense phase in downcomer due to their higher pressure drop.

2. Dense phase is mixed or "fluffed up" while falling from inlet weir by gas rising from inductors. No liquid runback on Kaskades as found on first rows of bubble caps.

3. Mixed phase of vapor-liquid maintains uniform density while being forced through perforated baffles. Bubble caps interfere with liquid flow across the tray.

4. Frothy mass entering downcomer is more uniformly mixed than with bubble trays. Bypassed liquid on bubble trays receives contacting only in downcomer.

5. Uniform ebullition over entire area gives uniform vertical velocities reducing trajectory of liquid into vapor space. Vertical liquid trajectory from area between bubble caps limits capacity.

6. "Benturi" vapor passages, having pressure drop characteristics of a well-designed venturi, accumulate mixing energy with minimum loss of pressure drop. Energy lost in riser, reversal, and annular space of bubble cap is not usable.

7. Vane arrangement serves to coalesce and return small entrained droplets to tray below. Such devices necessary to obtain the same results with bubble trays are too expensive.

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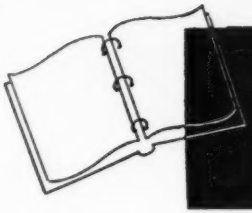

REFINER'S NOTEBOOK

Relief-Valve Performance Characteristics

by L. P. Stillman*

CONVENTIONAL and "back-pressure" relief valves were discussed in Nos. 112-116 inclusive of the Refiner's Notebook. In No. 113 capacity curves were presented. The capacity curve of the conventional valve was shown and points were plotted (in relation to the theoretical nozzle curve) for unbalanced bellows and balanced disk and vented piston types of valves.

Note that Fig. 1 of Installment No. 113 is in terms of absolute pressure. The characteristic curves presented on this page are in terms of gage pressure since coded springs are rated according to gage pressure. Table 1 shows how results differ when the break-point pressure ratio and closing pressure are expressed as percentages of the set pressure, either absolute or gage.

Fig. 1 shows characteristics when discharging against variable back pressure, for a conventional safety-relief valve.

Fig. 2 shows construction of a balanced bellows valve. Its characteristics at 10 per cent and 20 per cent overpressure are shown in Figs. 3 and 4 respectively.

Back pressure in the terminology of the safety-relief valve is the pressure existing at the valve outlet flange on the downstream side of the valve. This back pressure falls into two general classifications:

1. **Constant back pressure.**—When this is involved the standard, conventional valve is used.

2. **Variable back pressure.**—Back pressure of this kind if further divided into two types, "builtup" outlet pressures and "superimposed" outlet pressures. The first is that which builds up as the valve opens, as a direct result of the flow from that specific valve. Superimposed back pressure is that which already exists in a blowdown system when the valve is called upon to operate. Since superimposed back pressure is the kind that restricts valve operation most severely, the performance characteristics shown in this and the next installment are those resulting under superimposed back pressure condition.

*Chairman of A.P.I. Manufacturers Subcommittee on Safety-Relief Valves. Material from Manning, Maxwell & Moore Co. Bulletin No. 606, "Safety-Relief Valves for 100 Per Cent Variable Back Pressure."

TABLE 1

Gage pressure:	Psig.	Per cent	Psig.	Per cent	Psig.	Per cent
Set pressure	15	100	100	100	200	100
Point of break at 10 per cent overpressure	1.05	7	7	7	14	7
Closing point at 10 per cent overpressure	1.5	10	10	10	20	10
Absolute pressure:						
Set pressure	30	100	115	100	215	100
Point of break	16.05	53	22	19	29	13.5
Closing point	16.5	55	25	21.7	35	16.3

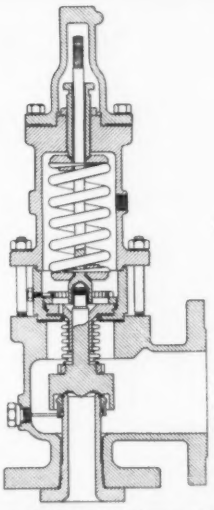

Fig. 2—Balanced bellows safety-relief valve.

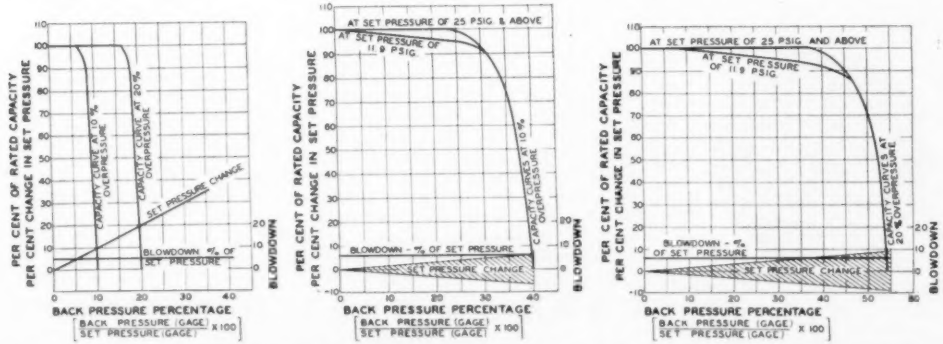
PER CENT OF RATED CAPACITY
PER CENT CHANGE IN SET PRESSURE
CAPACITY CURVE AT 10 % OVERPRESSURE
CAPACITY CURVE AT 20 % OVERPRESSURE
SET PRESSURE CHANGE
BLOWDOWN - % OF SET PRESSURE
BLOWDOWN
BACK PRESSURE PERCENTAGE
BACK PRESSURE (GAGE) / SET PRESSURE (GAGE) X 100
AT SET PRESSURE OF 25 PSIG & ABOVE
AT SET PRESSURE OF 11.9 PSIG.
AT SET PRESSURE OF 25 PSIG AND ABOVE

Fig. 1 (left)—shows characteristics of conventional relief valve, discharging against variable back-pressure. Figs. 3 and 4 (middle and right) show overpressure characteristics of balanced bellows valve.

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2 STUDIES IN CENTRALIZED LUBRICATION presents a series of illustrated case histories of actual installations of centralized lubrication, on all types of machinery and production equipment. *The Farval Corp.*

3 LAPP PULSAFEEDER FOR CONTROLLED VOLUME PUMPING. A new 24-page, 2-color bulletin describes a line of Pulsafeeder piston-diaphragm pumps. The feature of no stuffing box is stressed and it is noted that, although basically it is a pump, it will do the work of a chemical feeder, a meter, an instrument, a filing machine, a proportioner, and a sampler. *Lapp Insulator Co.*

4 CORROSION RESISTANT VALVES. A new 35-page service bulletin describing types, sizes, operation, and features of Rockwell-built Nordstrom corrosion-resistant valves. Special reference is also made to multiport, steam-jacketed, and power-operated valves and their varied applications in process industries. The bulletin contains typical analyses of cast iron, steel, semisteel, bronze, Mercoloy, Ni-Resist, stainless steel, nickel, monel, and Hastelloy B. *Rockwell Manufacturing Co.*

5 SELF-STICKING INDUSTRIAL PRODUCTS, a 50-page product catalog, contains information on wire markers, pipe markers, safety signs, "Scotchlite" reflective signs, masks and stencils, and printed roll tape. It also includes illustrations, specifications, numerous job applications, and complete price lists. *W. H. Brady Co.*

6 LIFE-LINE MOTORS. Design and application features of Life-Line motors (made in ratings up to 700 hp.) are described in a new 20-page booklet. Applications in chemical, central-station, and metal-working industries are illustrated and separate sections describe special construction of motor frames, end brackets, stators, rotors, and bearings. *Westinghouse Electric Corp.*

7 LIGHTNIN MIXER CATALOG, in 32 illustrated pages, describes turbine-type Lightnin Mixers for open and closed tanks, and contains a factual discussion of fluid agitation. It explains how guaranteed fluid agitation results may be obtained for any process, and how to anticipate process changes by installing a mixer with interchangeable speeds. *Mixing Equipment Co., Inc.*

8 LONG-WEARING MACHINERY PARTS is a 24-page booklet which describes a wide variety of cast and wrought alloy parts now being used in many industries to solve abrasion, corrosion, and high-temperature problems. More than 60 blueprints, tables, and photographs show some of the sizes and shapes in which these alloy parts are being used. *Haynes Stellite Co.*

9 CATALOG NO. GC-2 contains information on equipment such as giant revolver cranes, hoists, material

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elevators, car pullers, and Crosby wire-rope clips. It includes numerous on-the-job pictures. It is practically a guided tour of material-handling installations throughout the world. *American Hoist & Derrick Co.*

10 TURBINES. Six new bulletins describe high-efficiency impulse-type steam, gas, or air turbines for mechanical drive, recently expanded for general industrial use. One of the bulletins is devoted to each of the five types of turbines available, ranging from ¼ to 120 hp., giving performance charts, construction details, dimensions and weights, and selection data. The sixth bulletin provides general turbine information. *The Pyle-National Co.*

11 LARGE VERTICAL INDUCTION MOTORS, a four-page brochure, explains construction features and types of A-C large vertical induction motors widely used for pumps and other vertical drives. It covers motor ratings in 40 C, 60 cycle from 60 hp., 200 r.p.m. to 800 hp. and larger at 1,800 r.p.m. *Allis-Chalmers Manufacturing Co.*

12 FILM-TYPE HEATING ELEMENTS. Brochure discusses uses; methods of application; and mechanical, thermal, and electrical characteristics of the electrofilm-type heating element. Material is an electrically conductive plastic that provides highly uniform heat distribution and maximum heat transfer. A wide range of successful applications are covered. *Electrofilm Corp.*

13 DRILLING RIGS.—Bulletin 750 describes Hydrair and Mechanical 750 series drilling rigs, designed for 750 input horsepower, and available in two or three engine arrangements. Outstanding features include easy conversion of mechanical rig into torque-converter rig without major design changes, pressure water circulated brake rims, and oiltight housings for all chain drives. *IDECO Division, Dresser Equipment Co.*

14 FUNDAMENTALS OF INSTRUMENTATION FOR THE INDUSTRIES is the title of a 126-page booklet covering fundamentals of measurement, control, and transmission of variables encountered in industry. Typical applications are also discussed. *Minneapolis-Honeywell Regulator Co.*

15 ATTACHMENTS INCREASE PROFITS, a 32-page fully indexed catalog, shows many possibilities of adapting Caterpillar diesel tractors to specific jobs. It explains uses and construction of each tractor attachment. Thirty action pictures supplement the catalog views, and also specifications, drawings, and dimensions are provided where needed. *Caterpillar Tractor Co.*

16 V-DRIVE SELECTIONS can be made quickly and accurately with the practical aid of Engineering Guide No. 50-A. Simple formulas for standard quarter-turn and V-flat drives are augmented by tables of drives in all belt sections which have been compiled for quick selection of drives of required ratio and speed. *Fort Worth Steel & Machinery Co.*

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17 MULTISPEED POWER UNITS. This illustrated brochure contains complete technical data on two types of oil-field pumping transmissions. These units provide for four selective speeds. Continuous horsepower ratings range from 3 to 50 hp. *Turner Uni-Drive Co.*

18 SEISMOGRAPH. In a 48-page, illustrated, multicolored brochure, this exploration firm has traced the development and importance of the oil and gas industry. It discusses geological aspects, geophysical prospecting, and basic company policies. In addition there are concise explanations of seismograph reflection operations, gravity and magnetic surveys, and the use of Lorac. The booklet covers the organization that supplies these services. *Seismograph Service Corp.*

19 WHAT IS MICROWAVE? a 20-page illustrated booklet, describes latest developments and potentialities in radio equipment for point-to-point communication or remote control. It also shows how equipment in operation at unattended stations may be started, stopped, and regulated by means of impulses transmitted by radio. *Radio Corp. of America.*

20 ARIDIFIER. Catalog 252 discusses this device used for removing moisture, scale, and other impurities from air or gas lines. Installation data, and proper size selection charts are given, as well as dimensions and prices. *Logan Engineering Co.*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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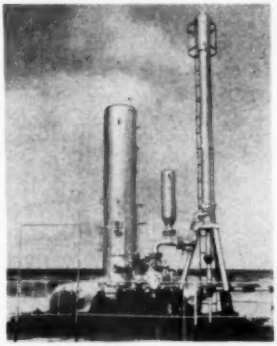
IT'S NEW CHECK IT

by Dan B. Miller

21 AUTOMATICALLY CONTROLLED LONG-STROKE HYDRAULIC PUMPING JACK. On automatic time-clock electric-motor operation the frequency and duration of pumping periods occur at predetermined intervals without attention from operator. With this long-stroke hydraulic pumping jack such automatic operation is extremely practical since the entire Pelton Unit functions on a closed hydraulic circuit. Unit shown is the Pelton 350-7-10 D-P with 10-ft. stroke. Hydraulic cylinder is 1 in. in diameter operating approximately 12 s.p.m. Maximum polished-rod load for this unit is 20,000 lb. The automatic control may be applied to the larger, 20, 25, and 30-ft. stroke Pelton models with maximum polished-rod loads up to 40,000 lb. *Pelton Water Wheel Co.*



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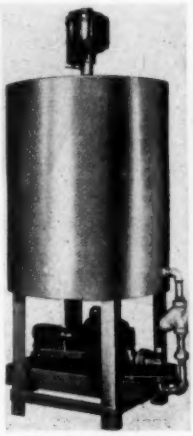
22 FOG NOZZLES. New low-priced all-stainless steel, fixed-installation fog nozzles for industrial processing and fire protection, known as the AA series, are smaller in size and lighter in weight than previous models. The AA series nozzles employ the patented spiral principle of atomization, and incorporate many refinements in design over similar earlier models. The same high efficiency and nonclogging performance are claimed, and a new design makes it easy to clean the AA nozzles without removing them from the installation. Bete AA Series nozzles are available in six models, three flow rates (1 to 10 g.p.m. range), and with a full or hollow cone fog pattern. A ¼-in. male pipe thread connection is standard, with a ⅜-in. pipe thread available on special order. *Bete Fog Nozzle, Inc.*

IT'S NEW CHECK IT

23 NEW CHEMICAL FEED PACKAGED UNIT. This unit is ideally suited for boiler feed-water treatment as well as for delivering chemicals and other fluids for processing. This self-contained, extra-heavy unit offers high-pressure controlled feed at low cost. The chemical reservoir tank is of sturdy welded steel construction, available in 50 or 100-gal. capacity. The chemical proportioning pump can be designed for various rates of feed at different pressures. A specially designed motor-driven agitator assures completely mixed fluids at all times. A stainless-steel strainer is provided between the suction side of the pump and the tank. The pump is mounted below the tank to minimize air binding and to maintain a positive suction head. A duplex-pump model with divided tank is also available. *The Bird-Archer Co.*



IT'S NEW CHECK IT

24 FLEXIBLE PLASTIC PIPE has been shown to be suitable for use in the transmission of natural gas. In addition, Carlon can be used to reline corroded metallic systems. Guaranteed against rot, rust, and electrolytic corrosion, it assures long, leakproof service life despite exposure to corrosive soils, waters, and fumes.

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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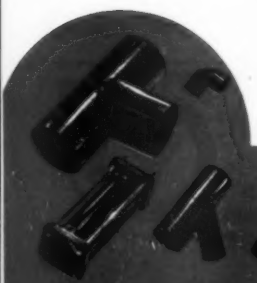

COMPLETE STOCK OF STANDARD PLASTIC CONNECTIONS

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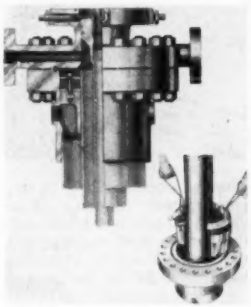
It is impervious to the chemical attack of acids, alkalies, sulfurous waters, and metallic salts. Because the smooth internal surface of the pipe will not accumulate sediment, Carlon provides permanent full flow. Flexibility of this plastic pipe is an important advantage in gas-line applications. It permits the pipe to absorb vibration stresses without developing leaks at the couplings. The pipe can be curved to follow irregular ditch contours eliminating the need for many fittings. A complete line of fittings is available. *Carlon Products Corp.*

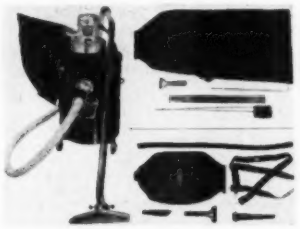
IT'S NEW CHECK IT

25 TYPE "UPS" HEADS. This new equipment features a design in which the packing element and the slips are combined into a single unitized assembly that wraps around the casing and is held in place by inserting one bolt. Hinged design of the slip assembly assures a full-circumferential grip around the entire surface of the casing, with each of the individual slip segments setting at exactly the same height as every other segment. Inasmuch as the packing element is unitized with the hinged slips, installation of the entire "UPS" head can be made very quickly without need for stripping the packing and slips over the casing or breaking any flow connections. The packing is expanded by tightening stud bolts around the upper face of the assembly and the excess casing is cut off. Elimination of threads and grooves provides a smooth surfaced bowl in which there is nothing to become damaged during drilling operations. UPS heads are so designed that each string of casing is separately landed and packed off without placing accumulated weight on preceding strings or slip members. *Baash-Ross Tool Co.*



IT'S NEW CHECK IT

26 NEW VAC-BLOWER OUTFIT with detachable power head and a wide selection of cleaning attachments will clean everything from basement to roof and will cut cleaning costs, because the one machine does the work of two. Among the cleaning jobs which the unit is particularly designed are: furnaces, radiators, overhead pipes, lighting fixtures, air-conditioning equipment, electronic instruments, stock bins, storage racks, machinery, motors, generators, telephone switchboards, bare floors, and other hard-to-get-at areas. The machine is powered by a heavy-duty, Universal type, 1-hp. motor which delivers a forceful, high-velocity air stream for blowing or a concentrated suction of 46-in. water lift for wet and dry vacuuming. *Multi-Clean Products, Inc.*

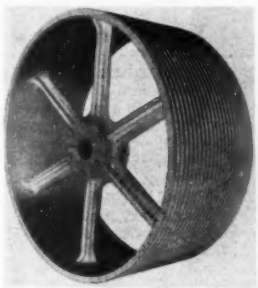


IT'S NEW CHECK IT

27 E-Z SWAB designed to make swabbing jobs safer and easier utilizes only one type of swab rubber. It swabs wells of all depths. Oversize streamlined tube passage and extra fluid passage around the edges of the swab rubbers cause the E-Z Swab to fall faster in fluid. On the down stroke when the rubber fins are in their normal upturned position their outside diameter is less than the inside diameter of tubing allowing the swab to fall free. Flexibility of rubber fins permits the swab to pass smoothly through tight spots in tubing or through paraffin bridges on both up and down strokes. When the operator attempts to pull too much fluid, the swab rubber fins bend down and bypass excess fluid. This safety-relief action prevents overloads and broken wire lines. After overload fluid is bypassed, Mission E-Z Swab fins spring up until they seal against the tubing. The operator can control amount of fluid lift because each E-Z Swab rubber will lift approximately 400 ft. of fluid. Operator can select the amount of fluid to be lifted before going in the hole by using one, two, or three rubbers. *Mission Manufacturing Co.*

IT'S NEW CHECK IT

28 V-BELT PULLEYS are now available in any size up to 70-in. pitch diameter and 36-in. face, for any standard belt size. Many sizes are carried in stock with the improved split-type removable hub which can be quickly bored and keywayed to any desired size. Other sizes and types can be cast and delivered quickly. The improved split-type removable tapered hub has a long and firm grip on the shaft, and is firmly bolted to both sides of the pulley hub, providing all the rigidity and strength of a solid hub and easier removal from shaft. *Wichita Falls Foundry & Machine Co., Inc.*



IT'S NEW CHECK IT

29 NEW DUAL FLOW CONTROL is a companion unit to its JE flow control. This new unit is designed so that by simply changing the flow-bean cage nipples the operator can use positive choke beans of any manufacturer. The Dual Flow Control replaces six different fittings: cross, two wing valves, two choke assemblies, and bottom-hole tester top assembly. With this new flow control operator may switch the flow from one sized choke to another without closing in the well and thus changing any of the well's characteristics. Replacement of all integral parts of the unit at the well can be accomplished in a matter of minutes. Dual Flow Controls effect a cost saving ranging as high as 75 per cent when used to replace 10,000-lb.-test conventional double wings. Weight savings range from 30 to 85 per cent de-

pending on the style of conventional double-flow wing tree the dual unit replaces. The opening through the valve seats is 1 in. plus in diameter and adequately permits flow volumes up to those going through a ¾-in. choke. *Oil Center Tool Co.*

IT'S NEW CHECK IT

30 NONFLUORESCING EMULSION MUD AND THREAD DOPE will not fluorence under ultraviolet light. It is known as OB No-Glo and has all the characteristics of an excellent oil-emulsion mud. It will not foam or ferment; is not a soap; and contaminants, such as cement, gypsum and anhydrite have little or no effect on it. One drum of No-Glo (407 lb. net) is added to every 5 bbl. clay-water mud in the system to produce a sodium-base emulsion in proportions of about 14 per cent oil and 10 lb. emulsifier to the barrel. It can be chemically treated in the normal manner and is easily converted to a lime-base nonfluorescing emulsion by adding 2 lb. hydrated lime and 1 lb. causic soda to each barrel of the emulsion. OB No-Glo can be used with salt water muds as well as any ordinary clay or bentonite water hole muds. Since most thread dopes will eventually cause OB No-Glo to fluoresce, a new product, OB No-Glo Thread Lubricant, should be employed whenever OB No-Glo is being used. This excellent thread lubricant has been field tested, contains no ingredients that will fluoresce, and has another unusual property of being water soluble. *Oil Base, Inc.*

IT'S NEW CHECK IT

31 SPEAKING TUBE FOR DRILLING RIGS affords conversation to and from any part of the derrick regardless of noise or interference of any sort. There are no gadgets to get out of order and no batteries to go dead. The usual hookup is from driller to monkey board to crown, but tube can be used in various places. It is made of heavy galvanized flexible tubing and can be furnished with polyvinyl covering. It is held in place with sturdy, quickly installed girth clamps. Heavy aluminum mouthpieces are installed on terminals. The tube, which can be easily installed in a few minutes, comes packed in a durable steel container. *S. & S. Specialties.*

IT'S NEW CHECK IT

32 LABELON TAPE, the new pressure-sensitive labeling tape on which you can write and which becomes a waterproof, oil-proof, and smudgeproof label, is now available in a total of four colors, seven widths, and two roll lengths. Made of two layers of acetate with a white waxy substance laminated in between, it derives its unique writing qualities from the pressure applied by pencil, stylus, or other blunt instrument rather than from lead or ink. Pressure on the top clear layer indents the white substance and exposes the bottom colored layer to view. The pressure-sensitive adhesive, which requires no moistening, adheres readily to glass, wood, metal, plastic, ceramics, or to almost any hard surface and the tape can be transferred repeatedly from the surface to another without destroying the adhesive qualities of the tape. *Labelon Tape Co.*

IT'S NEW CHECK IT

33 PROTECTO WRAP, a new glass-base pipe hand-wrapping material eliminates carrying hot dope from one wrapping job to the next. The warp is easily applied by flashing with a low-temperature torch thereby melting the enamel contained within the material itself. Protecto Wrap can then be easily wound around the joint, fitting, coupling, or hot spot, providing an even, corrosion-resistive coating. The new wrap is a protective coating of plasticized coal-tar enamel prefabricated with a woven glass fabric which acts as carrier and reinforcement for the paint. Supplied in widths from 2 to 24 in., Protecto Wrap is interwound with a paper separator that insures even distribution of the coating as well as easy unwinding regardless of temperature. The wrap has been designed to give the standard 3/32-in. coating when 50 per cent overlap is used. The glass, being completely inorganic, will not "wick out" the protective fractions of the coating nor will exposed strands carry outside moisture into the wrap. *Midwestern Engine & Equipment Co.*

IT'S NEW CHECK IT

34 GLASS BLOWER'S HAND TORCH has been specifically designed for removing and sealing off glass tubes in a vacuum system. It is a three-nozzle hand torch for a wide variety of glass-blowing operations. The U-shaped fork carries three grid-type, interchangeable, fish-tail burners, placed 90° apart so that the flames converge at the midpoint. When the burner is applied to an evacuated glass tube, the flames quickly soften a narrow circular band, causing the tube to collapse at that point and seal itself off. *Research Vacuum Supply Co.*

IT'S NEW CHECK IT

REFINING

Petrochem Growth

Potential of industry is tremendous, Warner says

NEW YORK.—Expansion of the infant petrochemicals industry has only just begun in spite of the tremendous gains it has scored in recent months.

J. Prince Warner, acting general manager of the chemical-products department of Esso Standard Oil Co., said recently that growth, expansion, new products, and new fields are characteristics of the industry and will continue to be for years to come.

Speaking before the Synthetic Organic Chemical Manufacturers Association of the United States, Warner said tremendous reserves of known and unknown chemicals are hidden away in the petroleum stockpile.

"Finding applications for the known chemicals and identifying and finding applications for the unknown will be an interesting and profitable endeavor in the years to come."

Petrochem investment.—Total investment in facilities to produce petrochemicals at present is estimated in excess of $1 billion and is growing steadily. In fact, Warner said, the business of petroleum refining has actually become a chemical industry in itself; so much so that it many times is difficult for a refiner to decide whether a given operation falls in the petroleum chemicals or the oil-refining category.

About 80 per cent of the petrochemical business is located on the Texas-Louisiana Gulf Coast, extending about 650 miles from the Rio Grande to the Mississippi. Warner said this area offers the necessary large quantities of raw materials—some of them not adaptable to large-scale transportation.

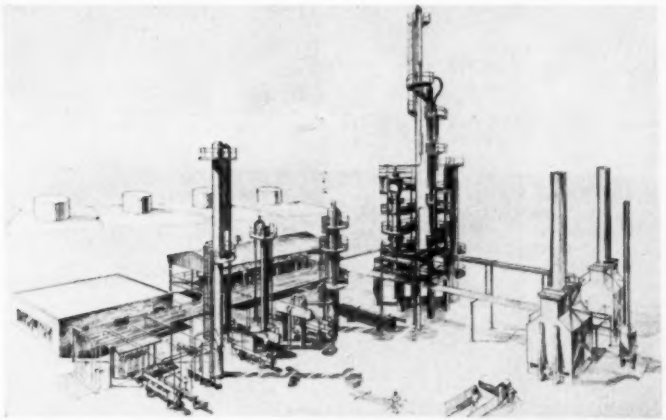
Plenty of room.—Even if the demand for petroleum chemicals doubles, the Esso executive said, the tonnage of hydrocarbons required would be less than 2 per cent of crude output.

The refiner's decision as to whether to go into petrochemicals manufacture may be one of economics. A chemical manufacturer coming to the refiner with a request for a supply of raw materials which seems to the manufacturer to be a profitable venture for the refiner may be dismayed over the time it takes for the refiner to come to a decision, Warner said.

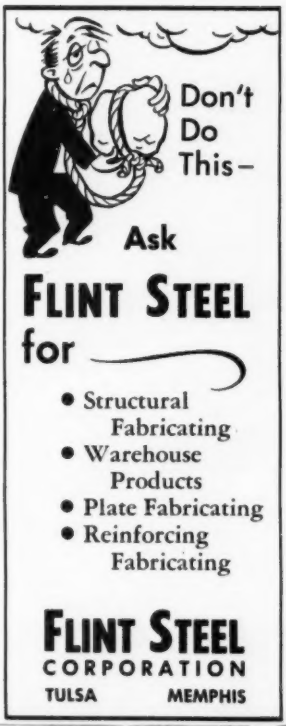
However, Warner said, "The refiner today is virtually utilizing everything in petroleum but the smell."

Indiana Standard Plans New Oil-Additives Plant

CHICAGO.—Standard Oil Co. (Ind.) currently has in the designing stage a new plant at its Wood River,



FIRST OF ITS KIND.—This artist's sketch gives a rough idea of what the world's first Fluid Hydroformer will look like when construction, began recently, is completed. Initial operation of the 2,000-bbl.-daily unit, designed and being erected at Pan-Am Southern Corp.'s Destrehan, La., refinery, is scheduled for August this year. The main group of vessels in the center is the reactor-regenerator portion of the plant. Atop the reactor (the largest vessel in the group) is the regenerator, while behind it stands the catalyst-storage drum. Other principal components (left to right) are: Control house, compressor house, three recovery towers comprising main fractionator, absorber and stabilizer, reactor-regenerator section, naphtha furnace, recycle gas furnace, and blowback air heater.



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Ill., refinery which will expand production of an improved detergent additive used in compounding heavy-duty motor oils.

Dr. M. G. Paulus, vice president in charge of manufacturing, said the company will begin construction soon, with completion scheduled for next year.

Indiana Standard introduced the additive in 1949. Paulus said it prevents sludge and varnish accumulation in internal-combustion engines and affords better lubrication and longer engine life.

Union Oil Details Plans For $27,000,000 Expansion

LOS ANGELES.—Union Oil Co. of California's $27,000,000 long-term expansion and modernization program at its Wilmington, Calif., refinery will provide the company with the largest total catalytic cracking capacity on the West Coast by the end of the year.

A breakdown of the program shows about $9,000,000 going into construction of a 28,500-bbl. fluid catalytic cracker and revamping of the T.C.C. unit to tie four reactors into the remaining fractionating column. Arthur G. McKee & Co., Cleveland, has the contract.

Fluor Corp., Los Angeles, has an $8,000,000 contract calling for construction of two 20,000-bbl. topping units and the 38,500-bbl. vacuum-distillation unit, revamping Unit 33 (distillation) to get the residuum feed stocks, and installing new yard piping.

A new 15,000-bbl. acid treater and redistillation plant is being built by Carl F. Braun & Co. for around $2,500,000.

About $800,000 in condensate-filtration and water-treating facilities is under construction by Bechtel Corp.; while Ralph M. Parsons Co. is changing the unisol plant to add a 10,000-bbl. catalytic gasoline-treating section for extraction of mercaptan sulfur, a $400,000 project.

Two new 400-lb. steam generators are being provided by C. C. Moore Co. for about $800,000. An electrical-distribution system is being installed for the new substation by Newberry Electric Corp. for $350,000, and Chicago Bridge & Iron Co. is building 13 new storage tanks totaling 454,000 bbl. in capacity and converting 8 more from cone-roof to floating-roof types.

Florida Storage Expanded

JACKSONVILLE, Fla. — Southern States Oil Co. will begin erecting four new 40,000-bbl. tanks here in June to store aviation gasoline for Navy installations in Florida.

The tanks, of the floating-roof type, will be located on 5 acres purchased from the city. They will increase the company's total storage capacity here and at Port Everglades to about 530,000 bbl.

Contract for the program, which will cost about $250,000 has been let to Chicago Bridge & Iron Co. First steel is scheduled to arrive in May. The project should be completed late this year.

Southern States is an independent firm with headquarters at the Municipal docks in Jacksonville. When the four new tanks are completed opposite the company's existing facilities on land leased from the Municipal Docks and Terminals, Southern States will increase its working force to about 30 men.

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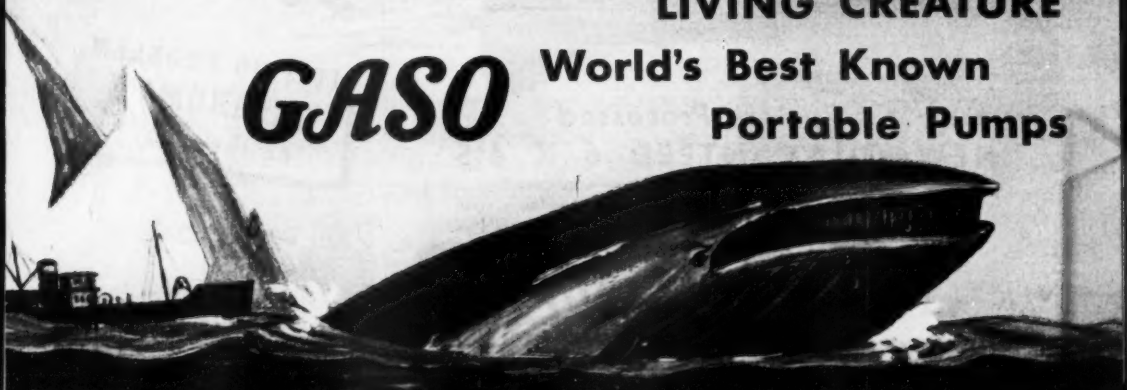

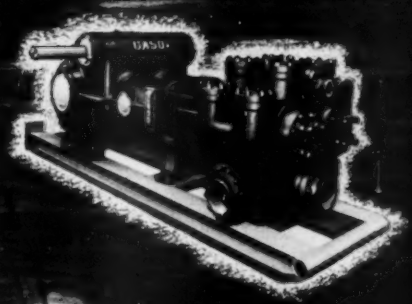

The fame of the blue whale rests on the fact that it is the largest of all creatures alive or extinct—100 feet long and weighing 150 tons.

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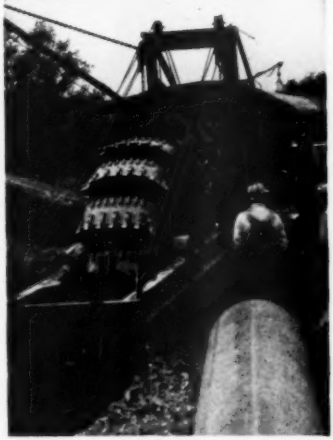

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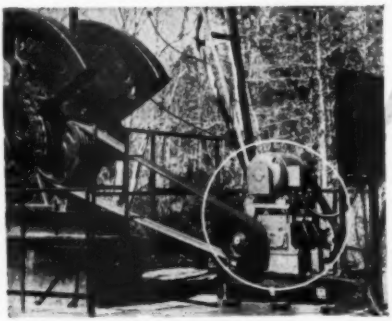

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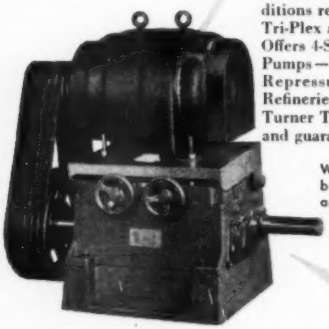

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PIPE LINES

PAD Approves Laying of Big Beaumont - Newark Line

WASHINGTON. — The Petroleum Administration for Defense has approved construction by United States Pipe Line Co. of its proposed 16 and 14-in. products pipe line from Beaumont, Tex., to Newark, N. J.

Officials of PAD also said they would recommend that the Defense Production Administration authorize 25 per cent accelerated tax amortization for the project.

Priorities assistance in obtaining pipe and other materials, however, will be withheld until United States Pipe Line shows firm arrangements on engineering, financing, and business commitments for products to be carried, officials said. The company will have until July 15 to assemble and present this information to the agency.

The big products carrier as planned would be 16-in. from Beaumont to Cincinnati and 14-in. from Cincinnati on to Newark.

Pipe-Line Facilities Hit By Rampaging Missouri

COUNCIL BLUFFS, Iowa. — The pipe-line terminal of Standard Oil Co. (Ind.) here, the last major oil installation remaining open in the flood - threatened Omaha - Council Bluffs area, was shut down early last week.

The terminal was closed by order of the United States Army Engineers, presumably as a precautionary measure since the terminal grounds still were above water.

Great Lakes Pipe Line Co., which pumps products to Omaha, had stopped shipments northwest of Kansas City, although the line to Des Moines and Minneapolis remained in operation.

Michigan-Wisconsin Pipe Line Co. had a 300-ft. section of line washed out by the high water at Rulo, Nebr.

Texas-Ohio's Plans for Big Gas Trunk Line Strike Snag

WASHINGTON.—Texas - Ohio Gas Co.'s plans to lay a 1,350-mile, 30-in. natural-gas trunk line from Texas to West Virginia have struck a Federal Power Commission snag.

The company was given a 10-day recess April 17 to answer to a commission examiner's contention that the company had not proved it could sell the gas it would export from Texas. The 10 days are just about gone.

Officials of Texas - Ohio maintain that several retail companies in its proposed service area in Ohio, West Virginia, and Pennsylvania have indicated that they will buy gas piped

MORE CRUDE CAPACITY.—Completion of recent construction of this 15-mile, 20-in. loop line by Service Pipe Line Co. from its Hulah, Okla., pump station to the terminal north of Caney, Kans., together with another loop completed earlier this year, will enlarge capacity of the company's crude-oil trunk system north of Drumright, Okla., by 38,000 bbl. per day. The previously completed loop, also a 15-mile, 20-in. line, extends north from Drumright. Laying operations, contracted by G. G. Griffis Construction Co., Tulsa, were hampered by heavy rains in the vicinity of Caney.

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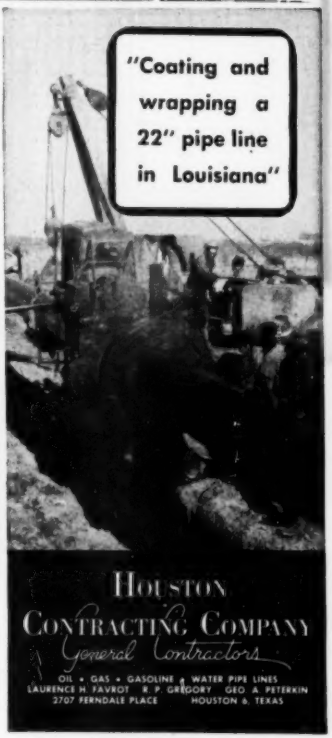
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WHEATLEY'S 6 x 6 PUMP EQUALS COMPETITOR'S 5 x 10 AND SAVES INVESTMENT

Compare Wheatley's 6" Stroke with Competitor's 10" Stroke
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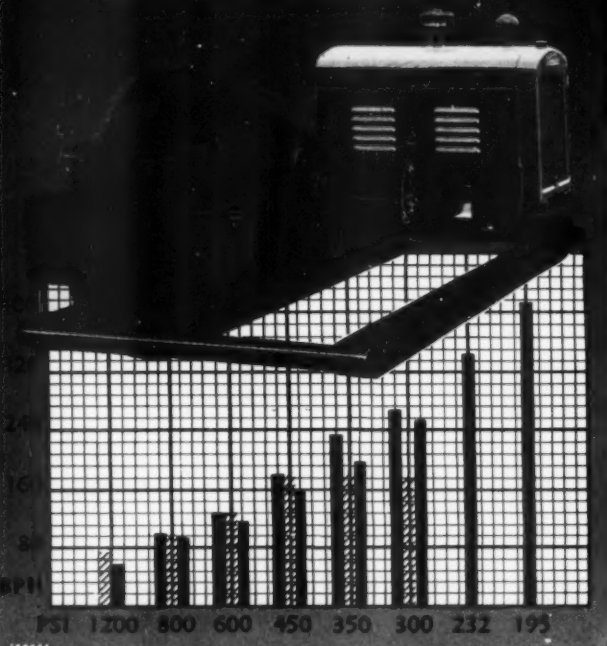

Wheatley 7024-4 x 6 @ 100 rpm Piston Speed = 100 FPM
Wheatley 7036-6 x 6 @ 100 rpm Piston Speed = 100 FPM
Competitors — 5 x 10 @ 54 rpm Piston Speed = 90 FPM

FEATURES

● 3¾" Face Herringbone Gear ● 2300# Weight
● 6.33 sq. in. Valve Area ● Crank Pin 3½" Diameter 3" Base
● 5850 lb. Plunger Load ● Round Valve Covers
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into the area through the $185,000,000 line.

Texas-Ohio was organized in May 1951 to build the line. The company's present plans call for construction to be accomplished in two phases. An initial daily capacity of 330,000,000 cu. ft. would be increased to 505,000,000 cu. ft. in the second phase. Ultimate capacity of 650,000,000 cu. ft. per day is contemplated in the future.

Originating in Hidalgo County, Texas, the line would extend through Arkansas, Mississippi, Tennessee, and Kentucky, and terminate near Spencer, W. Va.

According to a recent application on file with the commission, the company would import 200,000,000 cu. ft. of its gas supply from eight fields in the state of Tamaulipas, northeastern Mexico. The gas would be purchased from Petroleos Mexicanos, the Mexican Government oil agency, which would deliver it at the International boundary at the southern terminus of Texas-Ohio's proposed line.

These eight fields, the company said, contain total marketable reserves of more than 2 trillion cubic feet. A purchase contract has been written but not yet formally executed.

Texas-Ohio earlier this year requested a 90-day delay in the hearing date from February 1, which was subsequently turned down by the commission. In denying the request, FPC said the company had already been granted one extension and that its failure to be fully prepared at the start of the hearing to prosecute its application would be ground for dismissal.

Plantation Reveals Plans For New Expansion Program

ATLANTA, Ga. — Plantation Pipe Line Co. has completed plans for increasing capacity of three lateral lines to Macon and Columbus, Ga.; Montgomery, Ala.; and Chattanooga and Knoxville, Tenn.

Charles R. Younts, Plantation president, said the company, which recently completed a $52,000,000, 700-mile combination 18 and 14-in. parallel products line, will achieve the expanded capacity by constructing automatic booster stations operated by remote control from distant stations.

Both the Columbus-Macon line and the Chattanooga-Knoxville lateral begin at Bremen, Ga., while the Montgomery line originates at Helena, Ala., 13 miles south of Birmingham.

The company also plans to start immediately on expansion of its Gastonia, N. C., station on the main system, Younts said. When completed, line capacity through Gastonia to Greensboro, N. C., will be increased by more than 8,000 bbl. daily over present capacity of about 47,600 bbl. daily.

Plantation, a common carrier of re-

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Model M318-32 WINCHES

Conservatively Rated to 4,000 ft. of 2½" Tubing.

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fined products operating under I.C.C. regulations, delivers to 14 oil marketing companies in six southeastern states. Its parallel main lines, a 12 and 10-in. and the new 18 and 14-in., originate at Baton Rouge, La. By the end of this year the company will be pumping nearly 212,000 bbl. of products daily into its initial station on the Mississippi River, Younts said.

Hearing Opens This Week on Western Gas-Line Expansion

WASHINGTON. — Hearings are scheduled to begin here this week before the Federal Power Commission on seven applications for authority to construct natural gas pipe-line facilities to serve market areas in New Mexico, Arizona, Nevada, and California.

El Paso Natural Gas Co. is seeking permission to expand its pipe-line system's capacity to supply more gas to Pacific Gas & Electric Co., San Francisco; Southern California Gas Co. and Southern Counties Gas Co. of California, Los Angeles; and Nevada Natural Gas Pipe Line Co., Las Vegas, Nev.

The three California companies want authority to build additional facilities to transport the gas they would receive from El Paso.

Nevada Natural wants to build a 114-mile line to carry gas to markets in Nevada.

In addition, El Paso, in one of two applications recently consolidated with the hearing, is seeking authority to supply gas to Gallup, N. M., for use in a municipally owned electric-power generating plant. The second application was filed by San Diego Gas & Electric Co., San Diego, Calif., which wants to build a 1,760-hp. compressor station at Rainbow in San Diego County. San Diego purchases its gas from Southern Counties.

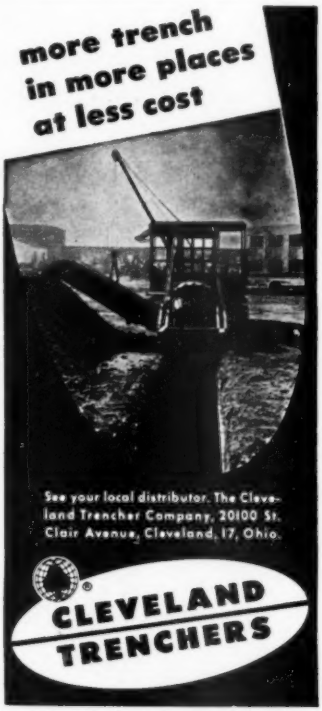
Pipe-Line Briefs

Ben Franklin Refining Co., a subsidiary of Bell Oil & Gas Co., will lay a new crude pipe line hooking in new production in Carter County, Oklahoma, with its present system. The company currently is trucking oil from the wells until a survey is made and right-of-way obtained. The new production is 9 miles from the company's refinery at Ardmore, Okla., and 1½ miles from existing lines.

Manufacturers Light & Heat Co. and associated Pittsburgh Group companies in the Columbia Gas System have asked the Federal Power Commission for permission to build nearly $4,000,000 in high-pressure gas lines. The new lines principally will be short runs from 1 to 2 miles long to supplement existing lines and replace sections of old ones.

The National Safety Council has cited Interstate Oil Pipe Line Co. as having the best safety record for Group A oil and gas pipe lines in the council's petroleum - safety contest. Interstate's winning lost-time industrial-accident frequency rate was 1.63 lost-time accidents per million manhours worked, as compared with an 8.52 average among the entire 23 major firms competing.

Pacific Gas & Electric Co. has completed 26 miles of the 8-in. line it is laying between Salinas and King City. The remaining 18 miles, from Greenfield to King City, will be completed as fast as steel pipe can be made available. Crews of P. G. & E. are doing most of the construction.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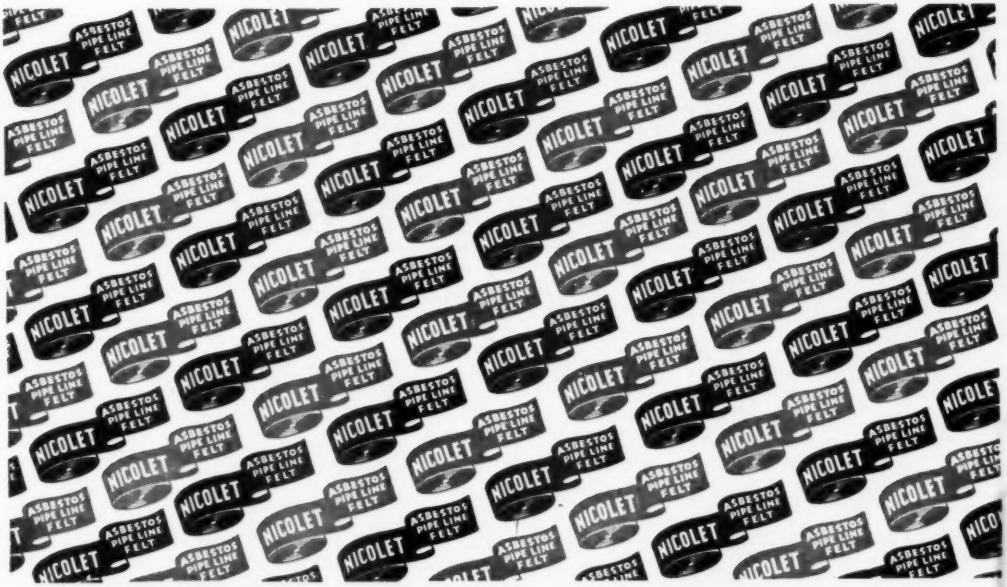

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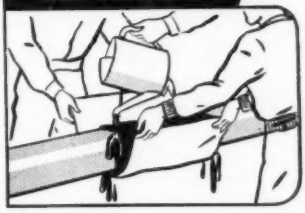
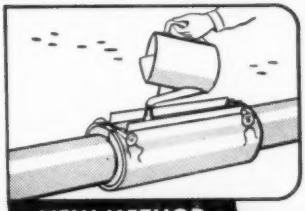
Slip on - Pour full - Lower in

OLD METHOD





NEW METHOD

INSTRUCTIONS:

1. Wrap "Field-Jointer" around pipe at the weld.
2. Pull string over top of pipe looping it around the opposite button, then return to original position. Be sure to pull string tight before fastening to avoid waste of material.
3. Pour coating material (must be hot) on top of pipe until "Field-Jointer" is full.
4. Allow to cool momentarily and lower-in.

"Field-Jointer" construction features heavy, rigid, paper mould equipped with felt inserts for each end, preventing waste, plus heavy button and string fasteners. One-quarter inch spacing between pipe and mould gives positive assurance of protection. Slip on—Pour full—Lower in.

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- ★ **Eliminates clean-up operations**
- ★ **Operates simply requiring no skilled labor**
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Among the

Drilling Contractors

New Firm to Operate in Permian and Latin America

T. J. Alexander, president of International, Inc., which recently began drilling contracting in Midland, stated that they were now drilling for the Plymouth Oil Co. in Glasscock County, Texas. The new firm intends to extend their operations into Latin America, where both he and Vice President John C. Head, have had considerable experience in the oil drilling business.

Both Alexander and Head have been associated with International Derrick & Equipment Co. for a number of years. Alexander formerly represented the company in Venezuela in the technical service department. Head spent 5 years in South America as superintendent with International Petroleum Co. and later the Ganzol Azul Oil Co. in Peru. Prior to the formation of the new firm Head represented the technical service department of International Derrick & Equipment Co. in West Texas.

H. L. Rowley, Inc., Shreveport, has contracted for a 10,000-ft. wildcat test to be drilled for John L. Loeb in Iberville Parish, coastal Louisiana. Location of the test, 1 Slack Brothers, is in 7-7s-10e, about 4 miles south of the Torbert field.

Briggs Contracting Co. is the contractor on a new Nacatoch sand test which Bryan E. Bush is starting in the Hosston field, Caddo Parish, northeastern Louisiana. The new operation is 1 Anisman-Bush-Jolley, in 24-22n-15w.

Zack Brooks Drilling Co., El Dorado, Ark., has taken on two additional contracts. One is with Munoco Co., also of El Dorado, for a 4,200-ft. Travis Peak test, to be drilled at 1 O'Keefe, in 5-14s-21w, a mile west of Irman, Nevada County, Arkansas. The other is with A. F. Akin and associates for a 5,200-ft. test at 2 Akin, in 16-23n-7w, at East Haynesville, in Claiborne Parish, northern Louisiana.

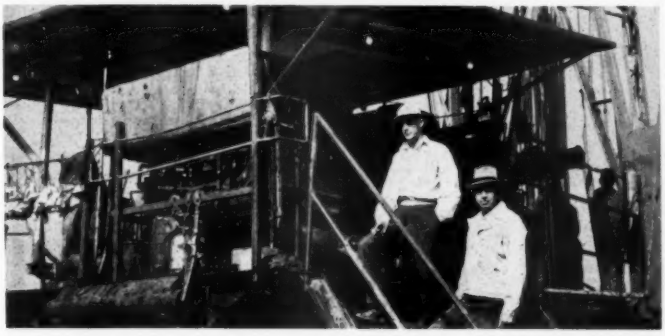
Tippett Drilling Co., Shreveport, will handle the contract for Roberts & Smith 1 Hunsicker, 15-20n-15w, about 2 miles west of new Rockpoint field, in the midst of shallow Pine Island production in Caddo Parish, Louisiana. The hole will be taken to about 3,800 ft. for a try at Kilpatrick production.

Gardner Brothers Drilling Co., Dallas, is starting a new operation for Southern Union Gas Co. at an extension location in the LaPlata area, San Juan County, northern New Mexico. It is 1 Page, in the NE SW SW 18-32n-10w, a Mesaverde test.

Bolin Drilling Co., Wichita Falls, Tex., is drilling a projected 6,100-ft. test for Tom B. Medders at a wildcat location 3 miles northwest of Park Springs, Wise County, northern Texas. The operation is 1 Younger, in Section 9, Falls-CSL Survey.

Johnson Drilling Co., Tyler, Tex., is contractor for B. G. Byars 1 Manners, 18-22n-14w, new wildcat 1¾ miles east and north of Hosston, Caddo Parish, Louisiana. The wildcat is a proposed Paluxy test.

Creighton Drilling Co., Tulsa, has been awarded contract to drill 1 Lewis in NW NE SE 9-17n-4e, Payne County, Oklahoma, for Warren Oil



Standing on the stairs of their new rotary drilling rig, working for Plymouth Oil Co. in Glasscock County, Texas, are, bottom, T. J. Alexander, and, top, John C. Head.

If mud gets to your joint threads, it can wash out a string in a hurry. 'Bestolife Lead Seal Tool Joint and Casing Compound gives maximum, *tight* joint make-up, keeps mud out. Standard of the oil country for more than 20 years. Unconditionally guaranteed. Packed in 1¼, 5, 20 and 50 lb. containers. Sold and exported by supply houses throughout the world.

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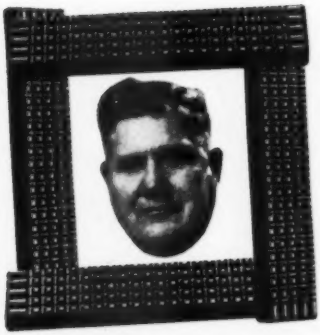

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Corp. The new venture is scheduled for 4,500 ft.

Crow Drilling Co., Inc., Shreveport, holds contract for one of a trio of wildcats starting in Caddo Parish, Louisiana. The test is O. G. Martin and Finn Myrdahl et al. 1 Herold-Wallace, 2-17n-15w, seeking Travis Peak production.

Fleet Drilling Co., Ada, Okla., has been awarded contract for a projected 5,250-ft. Wilcox sand operation at Ryan Oil Co. 1 Madison, NE NW SW 34-17n-1e, Logan County, Oklahoma. The newly staked operation is located ½ mile northeast of Northwest Iconium pool and 1 mile south of the new discovery south of West Central School pool.

Camay Drilling Co., a division of Southern California Petroleum Corp., has moved in heavy rotary drilling equipment on 1 Newhall Land & Farming Co. for a deepening job. The well is expected to test the Del Valle zone equivalent and possibly go to 10,200 ft.

Milton Crow, Inc., Shreveport, will handle the operations at Lyons-McCord & Logan 1 Allie Vaughn et al., C SW NW 3-17s-20w, a proposed 7,800-ft. Smackover lime wildcat 2¼ miles north of Magnolia field, Columbia County, Arkansas.

Fleet Drilling Co., Ada, Okla., is contractor for a new 6,800-ft. Simpson test in the shallow Madill field, Marshall County, Oklahoma. Anderson-Prichard Oil Corp., on deal with Ryan Oil Co. and Helmerich & Payne, is operating 1 Beard, C NE SW 25-5s-5e.

O. W. Killam has contract for a Zapata County, Texas, wildcat, being drilled for Panhandle Producing & Refining Co. The 1 J. C. Martin, 2,200 ft. Rosenberg try, is about 4 miles southwest of the new Gutierrez-Rosenberg field in Webb County.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 4-21-52	Change week ended 4-14-52	Change week ended 4-23-51
Gulf Coast	609	— 8	+ 70
N. & W. Tex.-N. M.	1,065	+13	+210
Ark.-N. La.-E. Tex.	145	— 2	+ 4
Oklahoma	350	+ 4	+ 33
Kansas-S. Nebraska	156	—18	— 8
Illinois-Eastern	100	— 9	+ 15
Rocky Mountain	189	+ 2	+ 67
Pacific Coast	160		+ 10
Total U. S.	2,774	—18	+401
Western Canada	134	— 6	+ 40
Total	2,908	—24	+441

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 161 and 162.

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NATURAL GAS

Transco Says Rate Boost Necessary for Expansion

HOUSTON.—Transcontinental Gas Pipe Line Corp. must have a "satisfactory" boost in rates in order to go ahead with tentative plans to raise delivery capacity of its system by 210,000,000 cu. ft. of gas per day.

Claude A. Williams, Transco president, told the annual meeting that the company can proceed with the expansion if the Federal Power Commission acts favorably on the application for a rate boost now before it.

If the increase is rejected or inadequate, he said, "we will just have to wait until we do receive them (higher rates) before doing any appreciable expansion."

The company's proposed rate hike of $13,654,000 annually will be put into effect by May 1, under bond and subject to final FPC determination. Williams told stockholders he thinks there is no doubt that the company will receive "some kind of rate increase."

Transco presently contemplates completion by July 1 of all facilities necessary to bring the big gas system up to its authorized daily capacity of 550,000,000 cu. ft. daily. No substantial construction is planned the rest of the year. Daily average deliveries by Transco in March reached 506,000,000 cu. ft. to set a new company record.

Williams told stockholders that Transco eventually will form a production company and will offer stock in this company to the Transco's present shareholders. He also said Transco has thought about and investigated the possibility of building a chemical plant along the pipe line but so far has taken no action.

Operating Revenues Up 15.3 Per Cent Over January 1951

WASHINGTON.—Operating revenues of natural-gas companies reporting to the Federal Power Commission totaled $190,922,222 in January, a big 15.3 per cent over receipts in January 1951.

Gas utility operating income amounted to $35,224,021, up 6.3 per cent; while net income gained 5.5 per cent to $29,791,586. For the 12 months ended January 31 of this year, net income rose 7.5 per cent to total $199,488,252.

Net gas utility plant of the reporting companies aggregated $4,220,658,009, up 20.7 per cent over the $3,495,393,619 reported a year ago. Gas operating revenue deductions amounted to $155,854,887, an increase of 17.5 per cent.

The figures are based on monthly reports to the commission by 87 natural-gas companies, 5 more than were represented in previous statements, and are not strictly comparable with preceding statements in the series.

Colorado Body Suspends Rule on Rangely Flaring

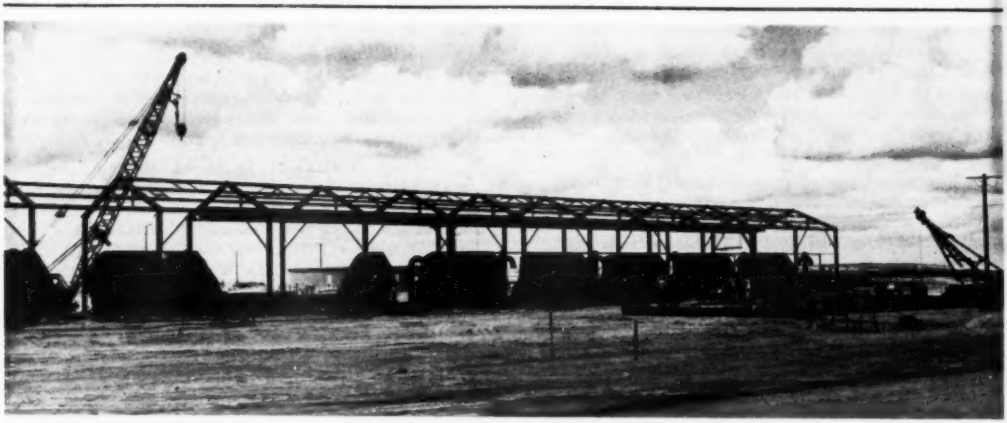
DENVER.—The Colorado Oil and Gas Conservation Commission has suspended its controversial "Rule Three" on gas conservation in Rangely field of western Colorado until a rehearing of the issue is completed.

J. J. Zorichak, commission director, said the commission will recess until May 22 and directed operators to file briefs outlining their views on the problem before that date.

"Rule Three," part of an order issued by the commission last December, the gas-oil ratio for wells producing from Weber pool at 1 M.c.f. of gas per barrel of oil. It also provided that no well may produce more than 150,000 cu. ft. of gas per day unless all over that figure is returned to the reservoir.

Companies objecting to the order, including The Texas Co. and Union Pacific Railroad, says it permits indiscriminate injection of gas which would cause waste by not resulting in maximum ultimate recovery.

An alternate plan which would separate Rangely into three unitized sections and provide for injection at either end of the field also was opposed on grounds that it would force gas up in the center of the producing dome and impair production of wells there.



After Completion, Moth Balls

Construction of the Navy's Elk Hills natural-gasoline plant has reached the stage that compressors have been set and foundations prepared for process columns. Supervised by Standard Oil Co. of California, operator of the Navy's reserve, the $4,500,000 plant is scheduled for completion in September. Work on the 100-mile, $2,000,000 gathering system is about 70 per cent completed. Situated in the western portion of the field, the plant will have an initial capacity of 50,000 M.c.f. which can be expanded to 100,000 M.c.f. Daily yields are estimated at 45,000 gal. of gasoline, 48,000 gal. of propane, 26,000 gal. of butane, and 15,000 gal. of isobutane. Unless the Navy Department and Congress rule otherwise, when the plant is completed this fall it will be put through a 30-day test run and then "mothballed." Construction of the plant and gathering facilities is being done by Parsons-Macco Co., Los Angeles.

CHAPTER TEN *in the Fascinating Story of the Search for Oil*

REFLECTION SEISMIC experimental investigations were initiated by Eckhart, McCollum, Karcher and Haseman as early as 1919. The method was used successfully to map subsurface by Burton McCollum in Mexico in 1924. The method was definitely established and used with productive practical results in 1930.

The use of the reflection technique, with its various refinements and extensions such as dip-shooting, continuous profiling, etc. increased rapidly and use of the reflection technique soon far outstripped all other methods.

The reflection seismic method, with innumerable refinements but few if any basic changes, has been the first exploration technique to stand the test of more than 20 years continuous and successful use in the search for oil. In fact, with acceptance of the reflection seismic method, geophysical exploration began to take on the proportions of a new division of the oil industry. Geophysical contracting firms, a rarity in the early 30's soon began to take their place in the oil industry and by the middle 30's geophysical contracting firms were firmly rooted and generally accepted as a highly specialized industry within an industry.

Thus, the reflection seismic technique which has been the backbone of most of the world's oil discoveries in the last 20 years, has not only been responsible for U. S. leadership in world-wide oil exploration, but also fathered a new industry which now employs many thousands of highly trained technicians and specialists.

GENERAL GEOPHYSICAL COMPANY, organized in 1935, is one of the early geophysical contracting firms which has grown to a position of leadership in the exploration industry. The first General Geophysical crew went into the field in 1935 in the vicinity of Garber, Okla., under the direction of Earle W. Johnson. Since then, the demand for General Geophysical Company crews has steadily increased with the increase in exploration activity. Today there are 25 General seismic crews, working from Canada to the Gulf Coast with specialized seismograph equipment, which has been developed in General laboratories to meet specific needs for various areas. Working as a wing of geological and geophysical departments under direction of the client's geologists or geophysicists, General crews have compiled accurate subsurface data which has resulted in many of the discoveries of past 16 years. So when you plan to explore new areas and deeper horizons, let General's capable crews help you.

General GGC
GEOPHYSICAL COMPANY
GULF BLDG. HOUSTON

New Area in Powder River Basin

HEATED exploratory interest in the Powder River basin appears ready to make another jump.

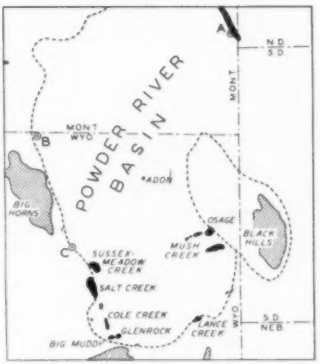
First one area and then another has kept this big unit the most active of the numerous Wyoming basins for the past few years—now comes an indication that exploratory activity may blossom in a heretofore unproductive area near the Montana-Wyoming line.

An indicated discovery, J. Ray McDermott 1 Barry, 24-58n-85w, in Wyoming just a few miles south of the Montana line (B on map), recovered more than 2,800 ft. of 36°-gravity oil on a 2-hour drill-stem test of the Upper Cretaceous - Shannon sand at 4,717-23 ft. This well, 110 miles north of the Sussex-Meadow Creek area where the Shannon is an important producer, is the first well to find oil in Sheridan County.

Cretaceous sands (Sussex, Shannon, Frontier, Newcastle, Dakota, and Lakota) have been the principal objectives in Powder River basin exploration during its 60 years of history, but the exploratory thinking that led to the development of production in these sands has followed various trends.

The first discovery of oil in the basin was made back in 1889 when, on the basis of seepages, a well was drilled just north of the Salt Creek structure. Following geologic studies, the structure itself was drilled in 1906; and while Salt Creek was developing into the biggest oil field in the Rocky Mountains, testing began on all other surface-expressed anticlines found on the rim of the basin —only Big Muddy (1915), Lance Creek (1918), and Midway (1931) were found productive. In 1938 and 1948 productive seismograph-located structures were found at Cole Creek. There was a brief period of interest in the productive possibilities of deep seismic structures out in the basin when the Pennsylvanian - Tensleep discovery at Adon was completed in 1948, but confirmation tests were disappointing and interest dropped back to the rim of the basin.

Meanwhile, in 1920, oil was found at structureless Osage where the discovery well was drilled on the basis of seepages. Following the development of Osage, interest was low on



the eastern side of the basin until 1947 when several big wells were completed at Mush Creek, a 1944 discovery. During the next 3 years the spotty, stratigraphic-trap pools of the general Mush Creek - Skull Creek-Fiddler Creek area were rapidly developed.

While the eastern edge of the basin was getting this intense hunt for Newcastle shore lines, interest jumped back across the basin to the flanks and plunges of the big surface structures where fault-trap accumulations appeared likely. Discoveries in and between the Sussex-Meadow Creek and Glenrock areas, which began in 1949, continue to this day; but the play that began looking for fault traps has become primarily a search for proper sand conditions off structure in some parts of this trend.

It is no longer only Cretaceous sands that are keeping the Powder River basin interest high. The Tensleep, originally found productive at Salt Creek, has had some promising developments in the past few months. Shortly before the end of last year Stanolind Oil & Gas Co. completed a Tensleep discovery well at North Fork (C on map). Continental Oil Co. has found the Tensleep productive at Meadow Creek. The United States Navy is making a Tensleep completion in its deep test of Teapot dome at the south end of the Salt Creek anticline. Another Tensleep discovery has been indicated about 12 miles south of Salt Creek at Carter Oil Co.'s Burke Ranch well.

In addition there is the developing interest in the extreme northern sweep of the basin that has been generated by the pre-Pennsylvanian discoveries in eastern Montana on the western edge of the Williston basin. A test of this area is Shell Oil Co. 1 Little Beaver (A on map), now drilling below 6,230 ft. without any recovery of oil as yet.

With the many kinds of oil-bearing traps developed, the numerous oil-bearing sands available, and the large area yet to be covered, the Powder River basin should see a good many more years of important developments.

Philip C. Ingalls

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

TEXAS PANHANDLE.—J. M. Huber Corp. is proving a gas discovery rich in condensate 13 miles southwest of Perrytown, Ochiltree County. Pool opener is 1 Pazoureck, 1,980 ft. from east and south lines, Section 16, Block J-T, TWNG Survey, 18 miles south of Beaver County, Oklahoma.

MISSISSIPPI.—Final completion has been made at Gulf Refining Co. 1 Chapman, Sr., "A," discovery well of Hiwannee field, Wayne County. The well flowed 266 bbl. of 39.5°-gravity oil daily from Lower Cretaceous.

PERMIAN BASIN.—Deep production for the northern end of the Permian basin has been assured at Coroco Drilling Co. 1 Atlas Life Co., western Terry County wildcat, 12 miles west of Brownfield. First drill-stem test had gas in 30 minutes, oil and mud in 45 minutes and clean oil in 50 minutes.

Southwest Texas

Jim Wells Discovery Slated For Potential Test

CORPUS CHRISTI.—H. H. Howell 1 J. E. McClaugherty, Jim Wells County discovery 2 miles northeast of Sandia, is slated for potential test after flowing oil on production tests. Casing was perforated at 5,250-5,320 ft. and recovery was 225 ft. of oil and 50 ft. of oil-cut mud in 7 minutes. Operator squeezed and will complete from perforations at 5,253-59 ft.

Meanwhile, Howell is drilling 1 Walter Brumme, a west offset to the discovery, which is slated to go to 5,400 ft.

Four miles southwest of Cuevitas in Jim Hogg County, Armstrong and Cotton, Inc., 3 Downs Royalty Corp., is drilling below 1,700 ft. after testing oil from the Hockley zone. A 30-minute drill-stem test at 1,669-74 ft. recovered 15 ft. of well saturated oil sand through ¼-in. chokes with slight surface blow and no pressures. This prospect is located in Block 51, Beer and Coffey Subdivision of El Javali Grant.

Lone Star Producing Co. 1 Mrs. Juan Lea, Atascosa County wildcat in J. A. Gutierrez Survey 1059, is coring ahead at 8,180 ft. after recovering oil and gas-cut mud on two drill-stem tests in the Edwards lime. A 15-minute test from 8,100-20 ft. recovered 90 ft. of oil and gas-cut mud and next test from 8,143-60 ft. recovered 32 ft. of mud cut with oil and gas. This venture is located 9 miles southeast of Pleasanton.

In the Bailey area of Jim Wells County, Bjarne Rossebo 2 Eva Copewood, is running log and setting casing at total depth of 5,467 ft. This wildcat recovered 800 ft. of pipe-line oil and 90 ft. of oil-cut mud on 15-minute drill-stem test at 5,455-67 ft. Operator utilized ¼-in. chokes. An oil sand was cored at 5,433-65 ft. in the venture.

Taylor Refining Co. & Mayfair Minerals Corp. 1 Lester Dawley unit, wildcat in John Closner Subdivision, 3 miles south of San Diego, is preparing to set pipe at 10,021 ft. preparatory to production tests.

McMullen County's deep wildcat, Phillips Petroleum Co. 1-A Washburn, B. S. & F. Survey, Abstract 99, is coring below 14,225 ft. with results of cores unknown. Venture is located 15 miles southeast of Fowlerton.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Aransas County: gas discovery—Humble Oil & Refining Co. 1 Aransas Bay State Tract 190, in Aransas Bay, TD 10,030 ft., perf. 9,454-95 ft., IP 4,600,000 cu. ft. of gas per day, open flow.

Duval County: oil discovery—Pontiac Refining Co. 1-A LeRoy Denman, Realitos Subd. of Copita Farm and Garden Tracts, Sec. 14, TD 5,064 ft., perf. 5,039-46 ft., IP 52 bbl. oil per day, ⅛-in. choke, 46.2° gravity.

New pay at North Government wells—Sun Oil Co. 94 Ludwina Wiederkehr, J. Poitevent Sur. 55, TD 5,420 ft., Queen City 5,411-17 ft., IP 136 bbl. oil per day, 9/64-in. choke, 44.9° gravity, TP 575 psi.

Hidalgo County: gas discovery—The Texas Co. B-1 Mrs. Isabel Y. Garcia, Anastacio Villareal Sur. A-85, Porcion 43, TD 4,510 ft., perf. 4,323-36 ft., IP 14,250,000 cu. ft. of gas per day, ⅛-in. choke, TP 1,776 psi.

Jim Wells County: oil discovery—Bridwell Oil Co. 2 Gertrude H. Hoffhines, William Parks Sur. 29, TD 3,886 ft., perf. Frio 3,328-35 ft., IP 27 bbl. oil per day, 7/64-in. choke, TP 200 psi., 53.7° gravity.

San Patricio County: gas-condensate discovery—Arkansas Fuel Oil Co. 1 Earnest Guedin, Jose M. Manchaca 2nd addition to Taft farm lands, Lot 5, Blk. 4, TD 9,259 ft., perg. 8,821-47 ft., IP 20,000,000 cu. ft. of gas per day plus 20 bbl. of condensate per million, SIP 3,000 psi.

Webb County, oil discovery—G. G. Mortimer, Jr. et al 1 R. F. Welhausen, CCSD&RGNG 2 Sur., TD 2,016 ft., perf. 1,875-90 ft., IP 18 bbl. oil per day, 43.8° gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: Leroy Robertson 1 K. G. Grandberg, John Sharp, Sur., dry, TD 2,834 ft.

Schimmel Taylor Co. 1 Herff McDonald, Felix Newman Sur. A-639, dry, TD 5,285 ft.

A. W. Schwarz 1 A. W. Vrana, Hidet Sur. 1501, dry, TD 1,007 ft.

Bastrop County: B. Coleman Renick, Hamman Oil & Refining Co. and Jake L. Hamon 1 W. B. Shanks et al, E. Burleson Sur., dry, TD 6,614 ft.

Brooks County: H. R. Smith et al 1 Chas. Boedecker et al, Ramon Guzman 14, A-267, dry, TD 9,010 ft.

Duval County: Long Bros. 1 State of Texas Sur. 42, Skid Yarbrough, A-2033, dry, TD 1,539 ft.

Frio County: Kirkwood & Morgan, Inc., 1 Edwin W. Mann, Jacob Hanz Sur. 216, A-373, dry, TD 4,324 ft.

R. D. Mebane & W. D. Miller et al 1 J. D. Oppenheimer, Henry Ferman Sur. 27, dry, TD 4,802 ft.

Jim Hogg County: Andrus & Walton 1 Hinojosa et al, Blk. 3, Sur. 122, E. W. Watts Subd., dry, TD 2,762 ft.

Sun Oil Co. 25 Weil Bros., Ge. W. Lowe Sur. 246, dry, TD 6,357 ft.

McMullen County: The Texas Co. 1 Douglas W. Rhode et al, SK&K Sur., Blk. 83, A-450, dry, TD 8,012 ft.

Starr County: German & McCaleb 1 Manuel Hinojosa, Porcion 111, dry, TD 4,393 ft.

Travis County: E. R. Marts 1 D. E. Chamberlain, Manning Sur., dry, TD 690 ft.

Webb County: Sid Katz-Pratt-Hewitt Oil Corp. A-1 Giulia B. Moglin, J. Poitevent Sec. 670, dry, TD 2,981 ft.

G. G. Mortimer, Jr. et al 1 A. Moos et al, Sur. 20 CCSD&RGNG Blk. 1, dry, TD 2,700 ft.

Zapata County: Killam & Hurd, Inc. 1 Maryland Trust Co., Sur. 314, dry, TD 2,000 ft.

Oklahoma

Activity in Central Part Of State Draws Interest

A NEW discovery for Logan County has been indicated at Woods Oil & Gas Co. 1 Brase, SE SE NE 10-19n-2w, more than 1 mile south of the old Lucien field. A drill-stem test of the lower Cleveland sand at 4,544-86 ft. yielded 205 ft. of heavily oil and gas-cut mud and some free oil. This indicated discovery well, scheduled to be carried to 5,300 ft., is now drilling ahead below 4,890 ft.

Davidor & Davidor 1 Harned, NE SE SE 4-15n-2w, 4 miles south of Guthrie in Logan County, is preparing for production tests after cementing casing at 6,148 ft., total depth. This well found promising oil showings in both the upper Cleveland sand and the Bartlesville sand, but tests of the Wilcox sands failed to indicate oil or gas.

In Grady County, Magnolia Petroleum Co. is preparing to test an indicated Springer sand discovery at its 1 Sarah Addison, C SE NW 13-4n-5w. This well is one location south of the Magnolia 1 Woodruff, discovery well of Southeast Bradley-Hart sand field. The 1 Woodruff, discovery well of Southeast Bradley-Hart sand field. The 1 Woodruff, completed for 159 bbl. of oil from the Hart at 8,960-92 ft., swabbed only 1 bbl. of oil an hour from the Springer perforated at 9,508-38 ft. Paradoxically, a drill-stem test of the 1 Addison recovered 720 ft. of oil and 810 ft. of oil-cut mud from the Springer perforated at 9,566-9,628 ft., but yielded only 360 ft. of oil-cut mud on a test of the Hart sand at 8,929-64 ft.

Another development in Grady County is at Northeast Bradley field where Gulf Oil Corp. 2 Mainka-Ring unit, C SE SW 1-5n-5w, is coring below 13,317 ft. This deep test is a northwest location to the discovery well of the field which produces from the Chimney Hill and the Bromide. The 2 Mainka-Ring unit has already indicated production in the Chimney Hill, first Bromide, second Bromide, and in the Tulip Creek.

Southeast of these developments in Garvin County, Phillips Petroleum Co. is testing its 1 Denson, SW SW SW 18-3n-3w, a significant indicated discovery northwest of Panther Creek field and 3 miles west of the general area of Golden trend development. A recent test of this well flowed 129 bbl. of oil in 13 hours through 12/64-in. choke, after Hydrafrac, from Hart perforations at 8,586-8,632 ft. This indicated extender of Hart production also has shown production in the Springer at 9,487-9,513 and 9,531-57 ft. Phillips has a confirmation well drilling below 7,500 ft., the 1 Barb, C NE SW 18-3n-3w. An offset location to the testing discovery has been staked by Sinclair Oil & Gas Co. in C NW NW 19-3n-3w.

Lincoln County continues to remain in the spotlight of Oklahoma developments. A promising discovery is Gulf Oil Corp. 1 Henthorn estate, NE NW NE of 1-12n-4e. This discovery swabbed oil at rates of 15 bbl. per hour from the lower Skinner sand at 4,090-4,105 ft.

Production tests are scheduled at a possible Red Fork sand discovery in Lincoln County at Jon Carson 1 Jones, SW SW NW 7-16n-2e. Gas reached the surface in 12 minutes on a drill-stem test at 4,624-49 ft. and pipe recovery after 1½ hours was 390 ft. of oil and 60 ft. of water. Casing has been cemented in this well, which is bottomed at 4,679 ft.

Sunray Oil Corp. 1 Wolfe, C NW NE 2-25n-25w, tested 3,765,000 cu. ft. gas daily following acid treatment of the perforated Morrow interval at 7,190-7,230 ft. This wildcat was drilled to a total depth of 8,245 ft., but is now plugged back to 7,271 ft. Casing is cemented at 7,315 ft.

For significant developments in the Texas Panhandle, which have a direct bearing on Oklahoma's northern portion of the Anadarko basin, see field reports under "Permian Basin."

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: Stanolind Oil & Gas Co. 1 McClure, SE SE NE 14-4s-2w, pumped 24 bbl. of 38°-gravity oil from 4,540-6,718 ft., TD 7,619 ft. PBTD 6,771 ft.

Noble County: Flynn Oil Co. 1 Wagoner, NE NE SW 23-21n-2w, flowed 35 bbl. of oil from Skinner 4,836-54 ft., TD 5,391 ft.

Osage County: Thomas E. Williams 1, 1 mi. east of Burbank, SE SE NW 36-26n-6e, pumped 21 bbl. of oil from Red Fork 2,701-07 ft., TD 2,826 ft. PBTD 2,720 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: E. L. Cox 1 G. C. Hollinsworth, SW NW SW 2-3s-3w, dry, TD 6,784 ft.

Garvin County: J. Tom Grimmett 1 Quinill, SE SE SW 18-3n-1e, dry, TD 5,000 ft.

Jackson County: Burton, Ingraham & Price 1 J. O. Rinder, C SE SW 24-1s-24w, TD 6,017 ft.

Jefferson County: Fred P. Schonwald-Christie-Stewart 1 Seay, SE NE SE 21-6s-5w, dry, TD 2,707 ft.

Kiowa County: O. C. Ewing 1 O. F. Koeltron, SE SE NW 24-5n-20w, dry, TD 595 ft.

Lincoln County: G. B. Suppes 1 Myers, NE SE NW 18-15n-4e, dry, TD 4,356 ft.

Logan County: Davidor & Davidor 1 Annie O'Neill, NW SW NE 12-19n-4w, dry, TD 4,710 ft.

Love County: Continental Oil Co. 1 Gant, NE NE SE 20-6s-1e, dry, TD 9,678 ft.

Marshall County: R. J. Caraway 1-B Rutherford, S½ NE SE 32-4s-6e, dry, TD 9,058 ft.

Osage County: C. L. McMahan 2 Osage, SE NE SE 35-23n-6e, dry, TD 3,335 ft.

A. A. Cameron 1 Osage, SW SW SW 11-26n-5e, dry, TD 3,058 ft.

Pittsburg County: Superior Oil Co. of California 1 Lytle, SW NE SW 12-7n-14e, dry, TD 8,172 ft.

Pontotoc County: L. W. Holshouser 1 Smith, SW SW SW 10-3n-6e, dry, TD 1,197 ft.

Canadian Fields

New Discoveries Reported In British Columbia

CALGARY.—Four wildcats in the Peace River region of northwest Alberta and northeast British Columbia were rated as discoveries during the past 7 days, including one which found oil and three that struck natural gas. The new oil strike and one of the gas finds were in British Columbia, while the other pair of gas discoveries were in Alberta.

Both of the Alberta discoveries are in the Peace River area of the province within the boundaries designated by the Alberta Government for gas export. That area takes in the region north of Township 68 to the south bounrary of Township 90, and the east boundary of Range 15w5 west to the British Columbia border. Several other gas discoveries have also been made in that area so far this year, and it is anticipated that numerous others will result in coming weeks and months, to considerably boost the region's gas reserve.

The oil and gas discoveries in British Columbia are both in the Fort St. John area, in the vicinity of Westcoast Transmission Co.'s proposed gas export pipe-line route. The oil find, that province's second indicated commercial oil well, is about 35 miles northwest of Dawson Creek and 27 miles west of the Alberta border. The discovery well is Pacific 7 Fort St. John.

The strike was made in the Cadomin sand formation which yielded gas and "wet" gas at rates up to 700,000 cu. ft. per day and fluid recovery up to 150 ft. of light crude oil, with estimated gravity around 40°.

The 7 Fort St. John is about 1¾ miles northeast of the Pacific Group's 1 Fort St. John wildcat which discovered oil in the Permo-Pennsylvanian formation last November. That Permo-Pennsylvanian discovery suspended operations during the winter months, and will commence a test period in the near future to determine the commercial prospects of its oil production. The No. 7 well is now being carried down in search of its lower objectives, including the Triassic which yielded a high volume of natural gas plus naphtha at the No. 4 well 1½ miles to the northwest.

British Columbia's new discovery, the fourth well that has found gas in the Fort St. John area since the Permo-Penn discovery last fall, is Pacific 5 Fort St. John, 6½ miles northwest of previous gassers. Gas came from the upper section of the Triassic, and flowed at rates 145,000 and 290,000 cu. ft. daily during two consecutive drill-stem tests. Hole is now at 4,104 ft., and crew is continuing down in search of the mid-Triassic zone which yielded gas at rate 9,000,000 cu. ft. daily at the group's No. 4 well.

The pair of gas discoveries in Alberta this week boost to 14 tne number of gas strikes for Alberta so far in 1952. One of the new gassers is being drilled by Texaco Exploration Co. in the Dixonville area. The other gas find was made by the team of Hudson's Bay Oil & Gas Co. and Union Oil Co. of California, in the Eaglesham area. This venture found about 40 ft. of gas pay zone in the Mississippian dolomite prior to entering water.

The Dixonville discovery is about 27 miles north-northwest of Whitelaw oil and gas production and 32 miles northwest of Peace River town. Two drill-stem tests, between 2,383 and 2,416 ft., flowed at rated 2,850,000 and 3,000,000 cu. ft. daily.

Hudson's Bay Oil & Gas Co. and Union Oil Co.'s Eaglesham discovery well is 20 miles southwest of the Hudson Bay-Union Tangent area gas wells, 11 miles southeast of Imperial's Belloy oil discovery and 45 miles southwest of Peace River town. Two drill-stem tests in the Mississippian between 4,672 and 4,718 ft. flowed gas at rates up to 1,810,000 cu. ft. daily. Drilling is currently continuing below 5,135 ft.

CANADIAN SUCCESSFUL WILDCATS

British American Oil Producing Co.-Cities Service 2 Clive, LSD 16, 17-40-24w4, TD 6,454 ft., capped gas well.

Delhi 1 Sullivan Creek, LSD 13, 25-17-5w5, TD 6,529 ft., capped gas well.

CANADIAN WILDCAT FAILURES

Imperial 10-3 Akenside, LSD 10, 3-54-22w4, TD 4,970 ft.

Amerada 1 Old Smokey, LSD 7, 4-50-17w4, TD 3,775 ft.

Trinidad 1 East Acheson, LSD 9, 31-52-23w4, TD 3,885 ft.

Shell 1 Maria Lake, LSD 1, 28-86-4w5, TD 5,220 ft.

Emjay 7 South Brazeau, LSD 2, 22-42-22w4, TD 5,700 ft.

Bailey-Selbay-Seaboard 1 Travers, LSD 16, 21-13-20w4, TD 4,425 ft.

Seaboard et al. 1 Warspite, LSD 13, 2-59-18w4, TD 2,504 ft.

(Continued on page 159)

Texas Gulf Coast

Final Completion Made at Hardin County Discovery

HOUSTON.—Final completion has been made at Shell Oil Co. 1 Kirby Lumber Corp. Tract 110-A, oil discovery in Hardin County 2½ miles southwest of West Village Mills production. From perforations at 7,048-81 ft., the well was completed for 19 bbl. of 19.6°-gravity oil daily through ½-in. choke. Tubing pressure was 1,220 psi. This discovery previously flowed gas and distillate on drill-stem test at 6,780-87 ft.

Magnolia Petroleum Co. has run liner in 1 Gracey-Wegenhoft, Colorado County prospect located 3 miles southeast of Garwood. This deep wildcat is bottomed at 14,381 ft. in sand and shale after coring sand with

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faint gas odor from 14,278-14,333 ft. Shale and sand was recovered on core from 14,338-81 ft. with no shows or odor. Location is in James Nelson Survey, A-35.

Also in Colorado County, Anderson-Prichard Oil Corp. has run 5-in. liner to total depth of 11,154 ft. in I R. A. Johnson, wildcat 1½ miles southwest of New Ulm. On drill-stem test conducted at 10,492-11,204 ft., using 1,000 ft. of water cushion, well had fair and steady blow during 19 hours tool was open. Recovery was water cushion, 5,000 ft. of heavily gas-cut mud and 3,250 ft. of slightly gas-cut brackish water. Gas-distillate shows have been tested in various zones up the hole with coring operations being continuous from 8,000 ft. to total depth.

Superior Oil Co. 1 McDonald, Brazoria County wildcat 3 miles southeast of Pledger field, tested gas-distillate on drill-stem at 10,382½-90½ ft. Well flowed 300,000 cu. ft. of gas per day through 10/64-in. choke and a considerable amount of distillate under tubing pressure of 755 psi. Hole is bottomed at 10,423 ft. with 7-in. casing at total depth.

Humble Oil & Refining Co. 1 South El Maton unit, gas-distillate discovery in David Ness Survey, Matagorda County, has been completed for a calculated open flow gage of 8,200,000 cu. ft. of gas per day. Production is from perforations at 10,700-04 ft. The venture also flowed 1,260 bbl. of 49.5°-gravity distillate daily plus 3,150,000 cu. ft. of gas. Tubing pressure was 4,525 on the test.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Goliad County: gas discovery—Salt Dome Production Co. & Currie B. Davis 1 Ed Billo, M. D. LaPena Sur. A-31, TD 3,710 ft., perf. 3,608-12 ft., IP 175,000,000 cu. ft. of gas per day, SIP 1,518 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Newman Bros. & Alaska Steamship Co. 2 Andrew M. Johnson, Bee County School Land Sur. A-102, dry, TD 4,440 ft.

Chambers County: Austral Oil Exploration Co., Inc. 1 E. E. Barrow, Solomon Barrow League A-31, dry, TD 7,248 ft.

Lloyd H. Smith, Inc. 1 J. J. Mayes et al, Tract "A," E. H. R. Wallis Sur. A-305, dry, TD 8,512 ft.

Goliad County: Ginther, Warren & Ginther 1 Robert Pettus, Pedro Trevino Sur. A-47, dry, TD 3,802 ft.

O. Neathery, Jr. 1 O. F. Schindler, Dan O'Driscoll Sur., dry, TD 4,362 ft.

Lavaca County: Dudley T. Dougherty 1 Joseph J. Jares, W. C. L. Foley Sur., dry, TD 7,642 ft.

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Mississippi

Another Gas Sand Tested at Forrest County Prospect

JACKSON.—Ohio Oil Co. has cored and tested another gas sand at 1 Coleman-Powe, 5-1s-12w, gas-condensate prospect in southern Forrest County. Drill-stem test was run at 7,312-15 ft., using ⅛-in. top and ¼-in. bottom chokes and 2,000 ft. of water cushion. Fluid was to surface in 11 minutes after tool was opened. Tool was left open for 20 minutes and well flowed gas and water cushion cut with condensate. Maximum top pressure reached 1,800 psi. Recovery from the test was 695 ft. of water cushion, 40 ft. of 57°-gravity distillate and 5 ft. of mud. Bottom-hole flowing pressure was 2,960 psi. Operator has quit releasing information on the interesting venture, however, it is reported that a total of 16 ft. of sand was pesent in this zone. Latest report is that drilling is being continued below 7,423 ft.

Final completion has been made at Gulf Refining Co. 1 H. A. Chapman, Sr., "A," 19-10n-6w, discovery well of Hiwannee field in Wayne County. From perforations at 9,595-9,608 ft., in Lower Cretaceous, the well flowed 266 bbl. of 39.5°-gravity oil daily through 10/64-in. choke. Tubing pressure registered 530 psi. Flow was cut 27 per cent with emulsion. It is hoped that this discovery will hold up better than other Lower Cretaceous discoveries in the state. However, after producing for 5 days, the 1 Chapman was flowing at approximately the same rate and tubing pressure had increased to 550 psi.

Gulf Refining has a prospective Wilcox strike in Wilkinson County at 5 Crosby Lumber Co. 23-3n-2w, 8 miles north of Woodville. Electric log and sidewall cores indicated shows of oil in the Wilcox at 7,156-68 ft. Operator has set casing to 7,208 ft. It is not known how strong the shows were or how much net sand is present in the 12 ft. interval to be tested.

At its confirmation try in the new Pollard field, Escambia County, Alabama, Humble Oil & Refining Co. seems assured of a well at 2 Moye, NW NW 18-1n-9e, direct west offset to the discovery. Top of Lower Tuscaloosa sand was cored at 5,918 ft. (—5,722 ft.) which is flat structurally with the discovery well. Good oil sand was cored to 5,959 ft. and sand with spotted oil show was recovered to 5,989 ft. At last report, operator was drilling below 6,035 ft.

MISSISSIPPI SUCCESSFUL WILDCAT

Wayne County: oil discovery—"Hiwannee" —Gulf Refining Co. 1 H. A. Chapman, Sr., "A," 19-10n-6w, TD 13,941 ft., Lower Cretaceous 9,505-9,608 ft., IP 266 bbl. oil per day, 10/64-in. choke, TP 530 psi., 39.5° gravity.

MISSISSIPPI WILDCAT FAILURES

Adams County: John S. Callon 2 H. W. Carter, 1-5n-1w, dry, TD 6,762 ft.

Humble Oil & Refining Co. 3 Ida W. Stowers et al, 9-8n-2w, dry, TD 6,007 ft.

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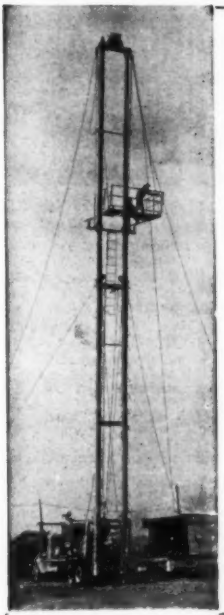

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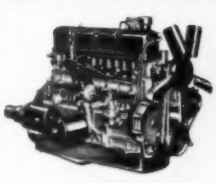

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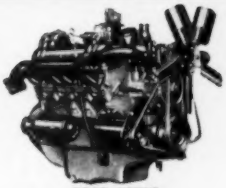

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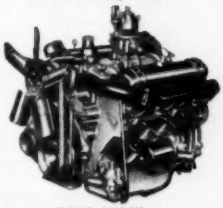

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WICHITA FALLS, TEXAS

North-Central Texas

New Pay Zone Reported In Wichita Falls Area

WICHITA FALLS.—Akin & Dimock apparently had a new pay zone in its 1-A Cunningham, located northeast of its 1 Cunningham, recent Vogtsberger sand discovery southwest of Wichita Falls.

Drill-stem test from 4,780-4,805 ft., open 2 hours, had gas in 8 minutes and recovered some 3,000 ft. of oil in drill pipe. Following the test it was cored ahead to 4,881 ft. The 1 Cunningham had top of pay at 4,886 ft.

Continental Oil Co. announced location for a 7,600-ft. wildcat for Cooke County. The well is to be the 1 C. G. Whaley, 5½ miles west of Muenster in the W. C. Winters Survey.

In Montague County Jack Grace Drilling Co. completed its 1 Mrs. J. C. Bryant as a lower Strawn limestone discovery. Pumping potential was 285 bbl. of oil a day from pay at 5,816-32 ft.

East of the Etter Bend conglomerate field, Transcontinental Oil Corp. 1 M. M. Gilbert was waiting on cement after running casing to 6,325 ft. Completion was planned from the interval around 6,262-68 ft. where a previous drill-stem test developed some free oil.

In the Etter area, Standard Oil Co. of Texas completed its 1 E. C. Aycock for a flowing potential of 482 bbl. of oil a day through 16/64-in. choke. Perforations were from 5,874-95 and 5,799-5,812 ft.

Kewanee Oil Co. had location staked for a 7,500-ft. wildcat, 3 miles south of St. Jo. The deep test is to be the 1 Boyd, on a 211-acre lease in the W. Edwards Survey, A-227.

A deep wildcat in a shallow producing area of Young County has been staked by Terrell Petroleum Co., Fort Worth, as the 1-B Fay Clark. Location for the test was in Section 218, TE&L Survey, 3 miles southeast of Olney. Projected depth was 5,000 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Callahan County: Fred M. Manning 1 R. L. Berry, Sec. 70, BAL Sur., TD 4,282 ft., completed as shut-in gas well, no gage on flow reported.

Cooke County: J. R. and Adam Seitz 1 J. S. Montgomery, T. J. Hutchinson Sur., TD 2,726 ft., Strawn sand 2,295-2,303 ft., IP 108 bbl. 40°-gravity oil, 18/64-in. choke, TP 90 psi., GOR 100 cu. ft.

Eastland County: L. A. Warren 1 M. M. Royall, 86-4-H&TC, TD 3,507 ft., Lake sand 3,502 ft., IP 157 bbl. 43°-gravity oil, 12/64-in. choke, TP 280 psi., GOR 644 cu. ft.

Haskell County: P. G. Lake 1 Frierson, 42-1-H&TC, TD 5,404 ft., elev. 1,657 ft., perforated Strawn sand 5,356-65 ft., IP 149 bbl. 39°-gravity oil, 11/64-in. choke, TP 405 psi., GOR 410 cu. ft.

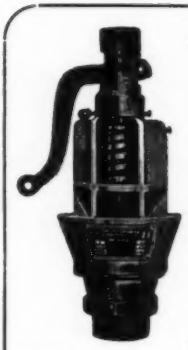
Montague County: W. H. Bryant 1 Fred Rowe, Sec. 16, Limestone CSL, TD 6,184 ft., elev. 901 ft., conglomerate pay 6,178 ft., IP 195 bbl. 44°-gravity oil, ⅛-in. choke, TP 650 psi., GOR 443 cu. ft.

Palo Pinto County: Rogers & Thomas 1 Swenson, 101-A72-BBB&C, TD 858 ft., pay 530 ft., IP pumped 25 bbl. 39°-gravity oil.

Shackelford County: F. Kirk Johnson 2 W. P. Newell, 10-12-T&P, TD 1,570 ft., pay 1,560 ft., IP pumped 22 bbl. 38°-gravity oil.

Stonewall County: Delta Gulf Drilling Co. 1 Odis M. Sparks, 161-D-H&TC, TD 5,295 ft., elev. 1,915 ft., Canyon reef 5,186 ft., IP 130 bbl. 36°-gravity oil, 20/64-in. choke, TP 75 psi., GOR 150 cu. ft.

Wichita County: Akin & Dimock 1-A Cunningham, Blk. 21, Lakeview Farms Subd., Denton CSL, TD 4,906 ft., pay 4,886 ft., IP 222 bbl. 44°-gravity oil, 16/64-in. choke, TP 200 psi., GOR 475 cu. ft.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Wilbarger County: Wm. H. Wilson 1 W. T. Waggoner, 16-5-H&TC, TD 2,400 ft., Milham sand 2,394 ft., IP pumped 80 bbl. 38°-gravity oil.

Frank Wood 1-ZZ W. T. Waggoner, 16-13-H&TC, TD 1,021 ft., pay 1,012 ft., IP pumped 25 bbl. 40°-gravity oil.

Young County: R. W. Darden 3 Joe Hunt, Blk. 185, TE&L, TD 1,022 ft., pay 1,019 ft., IP pumped 52 bbl. 37°-gravity oil.

Darden 5 Joe Hunt, Blk. 185, TE&L, TD 1,020 ft., pay 1,017 ft., IP pumped 61 bbl. 37°-gravity oil.

C. O. Elliott 3 J. R. Barnett, Blk. 186, TE&L, TD 1,025 ft., pay 1,020 ft., IP pumped 53 bbl. 37°-gravity oil.

San Juan and Shappell 1-E Burch, Sec. 466, TE&L, TD 3,824 ft., elev. 1,101 ft., pay 3,803 ft., IP 153 bbl. 41°-gravity oil, ¼-in. choke, TP 100 psi., GOR 350 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Producing Co. 1 Foster, McKinney & Williams Sur., dry, TD 805 ft.

Archer Drilling 2 Foster, McKinney & Williams Sur., dry, TD 739 ft.

Cullum Bros. Drilling Co. 1-A Key, Sec. 1, W. E. Probert Subd., dry, TD 5,264 ft.

G. E. Kadane & Sons 1-A Albright, Sec. 1, Hooper & Wade Sur., dry, TD 4,545 ft.

R. Clay Underwood 1 J. J. Perkins, Blk. 6, ATNCL, dry, TD 1,755 ft.

Texoma Drilling Co. 1 Eva Dyous, Blk. 142, Joe Ostane Sur., dry, TD 1,456 ft.

Baylor County: Archer Drilling 2 Mills, TE&L Sur., 3,137, dry, TD 1,475 ft.

Callahan County: McElroy Ranch Co. 1 A. H. Odell, Sec. 2,291, TE&L Sur., dry, TD 4,325 ft., elec. 1,527 ft., Caddo 3,339 ft.

Coleman County: United North & South Development Co. 1 Herring, Dugold McLean Sur., dry, TD 3,612 ft., Capps 3,263 ft.

Cooke County: Clark & Clark Petroleum Co. 1 Frank Klement, O. F. Leverette Sur., dry, TD 1,729 ft.

Eastland County: Robert Sunshine 1 W. M. Allen, T. A. Howell Sur., dry, TD 1,110 ft.

Cities Service Oil Co. 1-15 Swenson, Sec. 15, BBB&C, dry, TD 5,755 ft., elev. 1,499 ft., Palo Pinto 3,435 ft., Strawn 3,637 ft., Ellenburger 5,574 ft.

T. D. Humphrey 1 Ada Couch, W. Thornton Sur. 74, dry, TD 3,020 ft.

Jack County: Larson & Thomas 1 Floyd Nash, J. J. Rogers Sur., dry, TD 5,084 ft.

John L. McMahon, Jr. 1 J. T. Roney, Sec. 3,327, TE&L Sur., dry, TD 3,700 ft.

Jones County: Luther Hedrick 1 C. M. Sayles, 45-16-T&P, dry, TD 2,020 ft.

Ungren & Frazier 2 W. A. Watson, I. de la Garza Sur., dry, TD 3,551 ft.

W. T. Waggoner 1 J. L. Milsap, Sec. 333, Harrison CSL, dry, TD 3,373 ft.

West Texas Corp. and Fleet Oil Co. 1 Baker and Brown, 174-1-BBB&C, dry, TD 3,633 ft., elev. 1,740 ft., Noodle Creek 2,660 ft., Swastika 3,614 ft.

Montague County: R. E. Smith 1 Mrs. J. L. Rutherford, Blk. 47, H&TC, dry, TD 5,914 ft.

Nolan County: Gem Oil Co. 1 L. S. Howard, 56-22-T&P, dry, TD 7,383 ft., elev. 2,350 ft., reef 6,384 ft., Ellenburger 6,786 ft.

Palo Pinto County: Palo Pinto Oil & Gas Corp. 3 A. D. Popp, 54-2-T&P, dry, TD 1,511 ft.

Stephens County: Sorrels Oil Co. 1 Ross Elliott, 37-7-T&P, dry, TD 3,780 ft., Caddo 3,416 ft., Lake 3,382 ft., Ranger 3,777 ft.

Taylor County: Burt and Imes 1 H. J. Carson, 16-18-T&P, dry, TD 3,800 ft., elev. 1,870 ft., Coleman Junction 2,070 ft., Noodle Creek 2,420 ft.

Young County: L. B. Cobb 1 Pace & Strange, Blk. 3, A. Rohus Sur., dry, TD 741 ft.

R. W. Darden 4 Joe Hunt, Sec. 186, TE&L dry, TD 1,030 ft.

J. H. Riddle 4 H. O. Prideaux, Sec. 2, CTRR Sur., dry, TD 672 ft.

Riddle 5 Prideaux, A. Rohus Sur., A-240, dry, TD 718 ft.

Riddle 6 Prideaux, Rohus Sur., A-240, dry, TD 725 ft.

Riddle 7 Prideaux, Rohus Sur., A-240, dry, TD 725 ft.

Eastern Texas

Grayson County Well To Be New Sand Zone Discovery

DALLAS.—L. O. McMillan 1 J. E. Moran, in the McMillan Oil Creek area of Grayson County, was expected to be classified as a new sand zone discovery inasmuch as it had a 400-psi. difference in bottom-hole pressure from other wells in the field. On completion test the well flowed 332 bbl. of 44°-gravity oil a day through 3/16-in. choke from perforations at 8,044-58 ft., total depth. Gas-oil ratio was 1,432 cu. ft. and flowing tubing pressure was 1,360 psi.

Star Oil Co. 1 R. M. Brooks, Grayson wildcat 3 miles northeast of Sadler, was drilling in shale at 7,695 ft.

Humble Oil & Refining Co. 1 Fred Marberry, deep Freestone County wildcat northeast of Kirvin, may be drilled to 14,000 ft., according to field sources. The well had total depth at 12,960 ft., in the Smackover, but had no commercial shows in that formation. Last drill-stem test at 12,511-16 ft. had mechanical trouble but recovered the water blanket and 15 ft. of gas-cut mud. Several tests in the Pettit limestone developed shows of gas and at least one had oil-cut mud.

In Wood County, Jim McMurray 1 Burks, S. C. Shirley Survey, was swabbing low-gravity oil, with some salt water, through perforations from 4,522-28 ft.

In Harrison County, Zephyr Oil Co. 1

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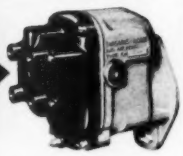

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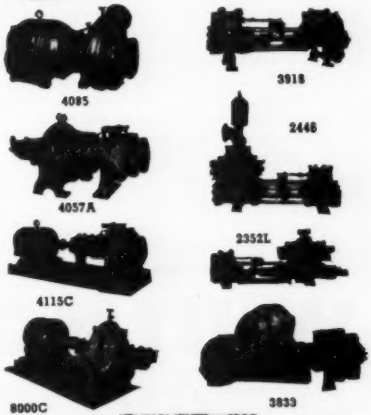

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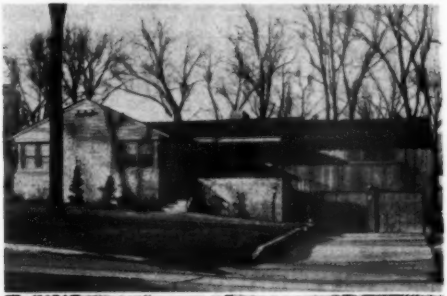

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Bogue, wildcat west of Waskom, was waiting on potential after flowing an estimated 200,000 cu. ft. of gas a day plus 10-15 bbl. of distillate, from perforations at 6,140-64 ft.

Byrd Frost, Inc. 1 Maddox Limestone County wildcat, was waiting on potential after gaging 4,300,000 cu. ft. of gas a day on 20/64-in. choke, from perforations between 5,540-70 and 5,920-30 ft.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Upshur County: P. B. Berry 1 Ada Coslett, F. Howard Sur., dry, TD 7,944 ft., Paluxy 5,520 ft.

Wood County: Ryan Consolidated Petroleum Corp. 1 H. G. Farr, M. Sosa Sur., dry, TD 4,633 ft.

California

California Exploratory Drilling on Upgrade

LOS ANGELES.—Exploratory drilling in California, which to date has been only slightly higher than that of a year ago, is being accelerated. Exclusive of extension tests, last week about 20 new wildcats were preparing to get under way or will be before May 1. Of the new crop eight were in Kern County, three were in Los Angeles, and the others ranged from Sacramento County on the north to Orange County on the south.

Among the new tests being started were Pacific Oil & Gas Development Co. 22-1 Boone, 3 miles northeast of Jasmine production; Enterprise Oil Co. 1 Enterprise, southeast of Antelope Hills in 8-28s-20e; Hancock Oil Co. 43-14 K.C.L., northwest of Gosford in 14-30s-26e; Standard of California 58-8 Mills in the Hanford area; and three shallow tests in the Tejon area of southeast San Joaquin Valley.

Precision Drilling Co. also was moving in equipment for 1 Capurro in the Moss Landing area of Monterey County. Superior Oil Co. was preparing to start 1 Douglas southeast of Oak Canyon production in the Castaic area of Los Angeles County.

Another test being started which will be closely followed was Richfield Oil Corp.'s southwest offset to its big Wheeler Ridge Eocene discovery. The test will be 76-29 K.C.L. in NE SE 29-11n-20w. The 10,000-ft. discovery was producing 35°-gravity crude at the rate of 260 bbl. daily through a 1/8-in. choke.

Developments in the Castaic area, California's current hot-spot, included the completion of four producers in the Honor Rancho-Castaic Hills field. Eight rigss were at work in the field. At Castaic Junction production 2 miles to the south, California Standard was testing at 12,700 ft. in its 1/2-mile extension attempt to that field.

Standard of California apparently has extended productive limits of San Ardo field's Aurignac zone further east with its B-14-5 Alexander. The extensioner, 3/4 mile from the pool proper and almost 1/2 mile southeast of the nearest Aurignac producer, was being placed on the pump at last reports. Drilled to 2,618 ft., 8 5/8-in. casing had been set at 2,492 ft.

A shallow test in the Placerita area of Los Angeles County also showed possibilities. The wildcat, Stine et al 2 Bailey in 1-3n-16w, found streaks of oil sand between 555 ft. and bottom at 816 ft. Casing was set to bottom and cemented through perforations at 526 ft., after which it was perforated from 555 ft. to bottom. It then was to be placed on pump for a production test.

General Petroleum Corp. has abandoned its wildcat northwest of Hollister in San Benito County. The test, 1 O'Connell Ranch in 11-12s-4e, was drilled to 4,656 ft. The operator was continuing to swab its wildcat in the Huron area of Fresno County but it is doubtful the deep test will make a commercial producer. Originally abandoned at 14,724 ft. about a year ago, 44-14 Boston Land Co. was redrilled to 13,193 ft. to make a second test of the potential pay.

CALIFORNIA SUCCESSFUL WILDCATS

Alameda County, new gas field discovery 3 miles southeast of Livermore: The Texas Co. 1 Hancock-Signal-Wente, SW NW 27-3s-2e, flowed at 280 M.c.f. rate through 8/64-in. bean, from 5,030-5,280 ft. TD 7,062 ft., plugged back at 5,280 ft., elev. 889 ft.

Kern County, deep Eocene sand pool in Wheeler Ridge area: Richfield Oil Corp. 85-29 KCL-D, NE SE 29-11n-2w, flowing 1,170 bbl. per day rate, through perforations at 9,592-9,756 ft., 35.3°-gravity crude, 17/64-in. bean, 2,800 psi. tubing pressure, 1,550 M.c.f., TD 9,756 ft., elev. 1,341 ft.

Los Angeles County, 1/2-mile northwest extension and new deeper pay zone (Honor sand) for Honor Rancho field: The Texas Co. 10 Honor Rancho A, SE SE 36-5n-17w, flowed 115 bbl. per day through perforations at 6,190-6,497 ft TD 6,544 ft., elev. 1,094 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Ciervo anticline area: Hancock Oil Co. 1 Glenn, 22-16s-13e, dry, TD 7,345 ft., elev. 1,598 ft.

Kern County, McDonald anticline area: The Texas Co. 3 Tolco (NCT-1), 20-28s-20e, dry, TD 2,913 ft., elev. 990 ft.

Kings County, Hanford area: A. C. Fisher 1 Jim, 34-17s-21e, dry, top Kreyenhagen 6,305 ft., TD 6,830 ft., elev. 250 ft.

Imperial County, Superstition Mountain area: The Texas Co. 1 Brawley Unit-Stipek, 4-14s-12e, dry, TD 8,648 ft., elev. 112 ft.

Monterey County, Biaggi area: C. A. Harris, Dave Horne & Paul Neighbors 1 Western, 2-22s-9e, dry, TD 1,268 ft., elev. 624 ft.

Tulare County, Terra Bella area: Tres Carlos Explor. Co. 4B Tres Carlos-Gardner, 35-22s-27e, dry, TD 1,700 ft., elev. 503 ft.

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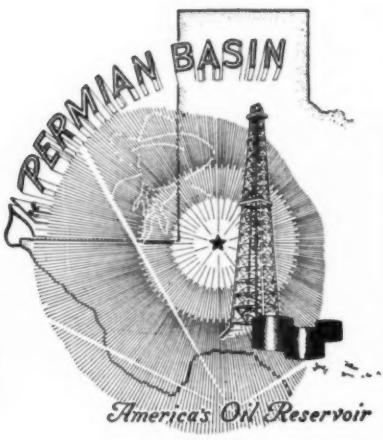

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MIDLAND 1, TEXAS

San Luis Obispo County, Temblor Range area: Neaves Pet. Developments 1 Neaves Elk Horn, 33-32s-22e, dry, TD 3,135 ft., elev. 2,431 ft.

Morales Canyon area: Richfield Oil Corp. 34-11 Ritter C, 11-11n-28w, dry, TD 5,777 ft., elev. 1,504 ft.

Ventura County, Cuyama Valley area: The Texas Co. 1 Blue Diamond, 10-9n-24w, dry, TD 5,875 ft., elev. 3,510 ft.

Permian Basin

Northern Permian Basin Assured Deep Production

MIDLAND.—Deep production for the northern end of the Permian basin has been assured at Coroco Drilling Co. 1 Atlas Life Co., western Terry County wildcat in 93-D11-C&MRR, 12 miles west of Brownfield.

Top of the Devonian was reported at 12,700 ft., on elevation of 3,457 ft. First drill-stem test had gas in 30 minutes, oil and mud in 45 minutes and clean oil in 50 minutes. It flowed into pits for 1½ hours through ⅝-in. choke, making an estimated 50-60 bbl. an hour. Oil in the pipe was circulated out. Operators drilled another 30 ft., to 12,760 ft. and reported drilling soft, with further oil shows. First test to total depth was delayed by mechanical trouble.

Three other pay zones have been indicated in the Coroco strike, all Permian. At 8,292-8,351 ft., in the Clear Fork, recovery on a drill-stem test was 5,100 ft. of clean oil. A 3½-hour test identified as in lower Spraberry at 9,194-9,245 ft. developed 7,400 ft. of oil, and a lime stringer at 10,057-117 ft., recovery was 7,400 ft. of oil.

The new discovery has started a leasing campaign in the area. Nearest production that is below the Permian is the South Brownfield-Pennsylvanian pool.

In Culberson County, northwest of the Grisham gas discovery, Magnolia Petroleum Co. 1-A Homer Cowden made an estimated 500,000 cu. ft. of gas a day on a drill-stem test at 7,538-7,638 ft. Recovery in the pipe was 6,278 ft. of gas-cut sulfur water. It was drilling ahead below 7,682 ft. at least report. Tentative identification of the section tested was the Devonian.

Further work in the Delaware basin included a new test to be drilled by Hisom Drilling Co., Midland. Location was made for J. T. B. Pruitt, Jr. in 20-1-W&NW, Ward County, as a 5,200-ft. operation. Drillsite is just southeast of the abandoned Pruitt area.

Five miles southeast of Barstow, Continental Oil Co. 1 L. M. Watson developed approximately 500,000 cu. ft. of gas a day on a drill-stem test at 5,556-91 ft. Recovery was 120 ft. of gas-cut mud and 180 ft. of oil and gas-cut mud. Drilling continued after the test.

In Coke County, Sun Oil Co. had six wells completed in the new Strawn sand pay recently added to Jameson field, and two new wells were testing and flowing oil, marking a 1¼-mile south extension to the area.

Sun 3-A Walker, Snyder & Von Rosenberg Survey, flowed 57 bbl. of oil in 12½ hours through 3/16-in. choke from perforations at 5,904-34 ft. and was shut in for storage. The well found the Strawn lime dry in drilling to 6,427 ft.

Sun 10 Walker became the first Strawn sand producer in the field south of the Colorado river. It previously produced from the lime at 6,303-49 ft., then plugged back to 6,022 ft. and flowed 28 bbl. of load oil and a like amount of new oil in 24 hours, through ¼-in. choke, from perforations at 5,908-38 ft.

Superior Oil Co. 4-16 Windham, Midland County, drill-stem tested in the basal Devonian from 12,352-485 ft., using 1,500 ft. of water cushion. Gas was at the surface in 40 minutes, and recovery was 265 ft. of

45°-gravity oil, 500 ft. of gas-cut mud and 90 ft. of drilling mud.

Gulf Oil Corp. 1 John Haggard, southern Roberts County's Ellenburger wildcat, found oil and gas shows in samples of the Douglas sand of Pennsylvanian age. A drilling break was reported at 6,198 ft., the formation drilling soft to 6,203 ft. where operators started coring. Top of the sand was placed at 6,198 ft. and minus 3,095 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Reagan County: L. F. Oil Co. 1 G. L. Welch, 44-C-L&SV, TD 6,730 ft., elev. 2,670 ft., pay 6,635 ft., IP 133 bbl. 37°-gravity oil, 5/16-in. choke, TP 175 psi., GOR 150 cu. ft.

Runnels County: Midwest Oil Corp. 1 Ralph Burns, Sec. 44, H. L. Hays Sur., TD 4,633 ft., perforated Goens lime 4,624-33 ft., IP 273 bbl. 45°-gravity oil, ¼-in. choke, TP 400 psi., GOR 215 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Crown Central Petroleum Corp. 1 Joe B. York, 280-97-H&TC, dry, TD 8,252 ft., elev. 2,399 ft., Pennsylvanian 6,440 ft., Mississippian 8,067 ft., Ellenburger 8,175 ft.

Brewster County: James L. Wood Oil & Gas Co. 1-47 Mary Decie, 47-4-GC&SF, dry, TD 7,514 ft.

Crane County: Gulf Oil Corp. 1-EE TXL, 19-43-T4S-T&P, TD 12,350 ft., elev. 2,764 ft., Devonian 9,910 ft., Ellenburger 12,197 ft.

Howard County: The Texas Co. 1 A. L. Wasson, 4-29-T1N-T&P, dry, TD 8,670 ft., elev. 2,300 ft., Pennsylvanian 7,820 ft., Mississippian 8,195 ft., Ellenburger 8,418 ft.

Mitchell County: James P. George 1 Mary Johnson, 4-26-T&P, dry, TD 3,590 ft., elev. 2,196 ft., Clear Fork 3,384 ft.

Reeves County: W. J. Weaver 1 Tunstill Oil & Land Co., 6-56-T2-T&P, dry, TD 3,126 ft., elev. 2,788 ft., Delaware lime 2,995 ft., sand 3,028 ft.

Runnels County: T. D. Humphrey 1 J. L. Elkins, Blk. 14, N. Travis Sur., dry, TD 4,267 ft.

Murray Petroleum Co. 1 Curry & David, 102-64-H&TC, dry, TD 4,774 ft., Capps 4,262 ft., Fry 4,320 ft.

Schleicher County: Pure Oil Co. 1 J. S. Roach, Sec. 1,200, Georgetown RR Sur., dry, TD 7,364 ft., elev. 2,450 ft., Strawn 7,283 ft.

Upton County: Pure Oil Co. 1 R. S. Windham, 107-D-GCSD&RGNG, dry, TD 10,550 ft., elev. 2,830 ft., Wolfcamp 7,630 ft.

Ward County: W. E. Butler 1 Joe A. Worsham, 42-33-H&TC, dry, TD 4,851 ft.

TEXAS PANHANDLE

The Texas Panhandle portion of the Anadarko basin has three promising new discovery wells. In Hutchinson County The Texas Co. is proving a new oil discovery located 10 miles south of Hansford. The Texas Co. 1 Holt, 1,980 ft. from north and west lines, Section 52, Block 5-T, T&NO Survey, is swabbing 2 bbl. of oil per hour through open tubing from acidized perforations in Spergen (middle Mississippi lime). Total depth of the prospective discovery is 7,900 ft. in Ellenburger lime. The discovery is down dip on south flank of the old Collard structure, similar to Lips Ranch in Roberts County.

J. M. Huber Corp. is proving a rich gas-condensate discovery 13 miles southwest of Perrytown in Ochiltree County at 1 Pazoureck, 18 miles south of Beaver County, Oklahoma. Crews perforated Atoka (possibly Morrow) sand at 8,031-36 ft., testing flow of gas at 1,500,000 cu. ft. per day with a rich condensate yield not measured.

In Roberts County, 25 miles south of Lipps Ranch field, Gulf Oil Corp. drill-stem tested a new show of gas and resumed drilling at a 12,500-ft. wildcat, 1 Haggard, Section 5, Block 2, I&GN Survey. On test from 6,146-6,221 ft. gas flowed at rate of 971,000 cu. ft. per day with 360 ft. of gas-cut mud recovered.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Ochiltree County: Sinclair Oil & Gas Co. 1 Hoover, 218-43-H&TC, dry, TD 10,155 ft., elev. 2,981 ft.

Parmer County: U. S. Semlting Co. 1-A Osborn, 5-1n-3e, dry, TD 9,720 ft., elev. 4,164 ft., San Andres 2,520 ft., Clear Fork 4,830 ft., Tubbs 5,015 ft., Abo 5,640 ft.; by samples: Wolfcamp 6,590 ft., Cisco 7,675 ft., Canyon 8,030 ft., Strawn 8,400 ft., Bend 9,065 ft., Mississippian 9,420 ft., granite wash 9,635 ft., pre-Cambrian 9,715 ft.

SOUTHEASTERN NEW MEXICO

Joseph O'Neill, Jr. 1-A State, Lea County wildcat south of Hobbs, drilled to the pre-Cambrian at 9,695 ft., on elevation of 3,576 ft., and plugged back to test around 7,340-7,580 ft. which had oil shows on drill-stem tests. A 1-hour test in the Ellenburger at 9,605-9,724 ft. developed 1,300 ft. of salt water, with no shows.

Humble Oil & Refining Co. 1 Federal-Elliott, Lea County wildcat had total depth at 14,750 ft. and was running electrical logs. Drill-stem test in the Devonian at 14,716-48 ft. recovered 540 ft. of brackish water.

Phillips Petroleum Co. 1 Chem-State, deep test in 4-15s-32e, was waiting on cement after running 5½-in. pipe to 9,903 ft. Drill-stem test at 9,711-94 ft. developed 3,800 ft. of 41°-gravity oil.

Stanolind Oil & Gas Co. 11-X State had total depth at 8,160 ft., in granite. Operators perforated casing in the Abo section at 7,260-90 ft. and swabbed 84 bbl. of oil in 12 hours; then perforated from 7,200-40 ft. and swabbed 50 bbl. of oil in 18 hours.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Lea County: Atlantic Refining Co. 1-V State, 10-14s-33e, dry, TD 10,014 ft., elev. 4,217 ft., Abo 7,750 ft., Wolfcamp 9,100 ft.

Gulf Oil Corp. 1 Lea State, 20-15s-33e, dry, TD 1,140 ft.

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Horsehead Confirmation Fails in Pettit Lime

SHREVEPORT.—Gulf Refining Co. has abandoned 1 Stonecipher-Foster unit, NW SE 15-19s-21w, ½ mile north of Horsehead field's discovery well, Columbia County, Arkansas. Operator drilled to 5,915 ft., set 5½-in. casing at 5,911 ft. and perforated between 5,816-24 ft., acidized and swabbed, perforated again between 5,817-66 ft. Oil-cut mud was recovered, with a slight show of oil.

Crews are reported to be trying to regain circulation after finding gas kick at W. G. Skelly 1 Dickson heirs, 36-19s-27w, wildcat in Miller County, extreme southwestern Arkansas. Gas kick occurred while operator was coring a cut at 11,034 ft., according to reports. The wildcat is located 3 miles east of Kiblah.

Big Chief Drilling Co. will test a show of gas found in the Atoka at 811 ft. at 3 Low-Gap unit, 30-11n-24w, Johnson County, northwestern Arkansas. Hole was taken to 1,643 ft. before being plugged back. The wildcat is located about 2½ miles northwest of Harmony.

At a venture about 8 miles southeast of Hamburg, Ashley County, in Section 11-18s-6w, Sam M. Richardson has spudded and is drilling at 2,375 ft. at A-3 Crossett Lumber Co. This is the fourth in a series of wildcats for Ashley County. Production will be sought to about 3,500 ft.

Alcan Oil Co. is testing a show of oil in the Meakin at 1 Freeman-Smith, C NW SE NW 26-14s-15w, wildcat 1¼ miles south of Delhi, Calhoun County. The hole is bottomed at 2,412 ft. Base of Chalk is 2,388 ft.

Louisiana.—Shell Oil Co. has set production casing at 8,030 ft. at 1 Robert L. Andrews, 713 ft. from south line, 608 ft. from east line in Section 34-23n-2e, wildcat 1½ miles north of Marion, Union Parish.

Best shows on drill-stem test were at 5,515-25 ft. in Cotton Valley and 7,947-69 ft. in Smackover. A 30-minute drill-stem test on the Cotton Valley interval recovered 3 bbl. of mud and salt water cut with oil and 1,047 ft. of salt water and mud. Smackover test recovered 300 ft. of gas-cut mud and some salt water.

Production pipe has been run by The Texas Co. at 1 A. J. Gamble, C NE SW 19-13n-14w, dry, wildcat 1½ miles northwest of Grand Cane and about 4 miles northwest of Grand Cane field, De Soto Parish. Pipe was run to 4,600 ft. to test undisclosed shows. Total depth of the well is 7,175 ft.

A. J. Hodges Industries, Inc., E. V. Whitwell, H. W. Perritt, F. B. Treat and U. Allbritton have completed a new-pay discovery in Cotton Valley field, Webster Parish, at 1 F. B. Treat et al. The new producer was completed from Pettit perforations at 5,866-80 ft. The well flowed 177 bbl. of oil per day with the gas-oil ratio 684:1.

Mid-Century Oil & Gas Co. has completed 1 Dr. W. B. Worley, C SE NW 5-13n-15w, confirmation to Rodessa discovery in Longstreet field, De Soto Parish, for a calculated open flow of 29,000 M.c.f. of gas daily. The new producer was finaled through perforations at 5,372-86 ft. in the Gloyd after acid treatment.

Hunt Oil Co. is drilling ahead below 3,692 ft. at 1 Louisiana Central, wildcat 3 miles southeast of Enterprise in Catahoula Parish in Section 3-10n-6e. Wilcox production will be sought to 5,000 ft. in an almost unexplored area.

LOUISIANA WILDCAT FAILURES

Caddo Parish: C. P. Porter et al 1 H. S. Turner, C SE SW SE 24-17n-15w, dry, TD 2,202 ft.

Concordia Parish: Barnett Serio et al 1 S. H. Calvert, 2,204 ft. S and 660 ft. E NWc 24-7n-7e, dry, TD 6,505 ft.

R. A. Campbell et al 1 Sharp "A," 4,000

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ARKANSAS WILDCAT FAILURES

Ashley County: Lion Oil Co. 1 Crossett Lumber Co. "B," C NE SE 8-18s-5w, dry, TD 3,513 ft.

Ouachita County: Garland Anthony Oil Co. 1 I. G. Peace, C SW SW SW 5-14s-18w, dry, TD 2,242 ft.

Kansas

Another Oil Discovery For Seward County

THE high interest in the potentialities of the shovel end of the Anadarko basin in southwestern Kansas and northwestern Oklahoma got another shot in the arm with the successful completion of Flynn Oil Co. 1 Jury, SE SE NW 26-33s-31w, Seward County, about 1 mile south of Kismet field.

This wildcat flowed 3½ bbl. of oil per hour through tubing following a 3,000-gal. acid treatment of the Mississippian - St. Genevieve section. The well was drilled to a total depth of 5,860 ft. and casing was set at 5,855 ft. This discovery was originally indicated by a drill-stem test at 5,818-60 ft. which recovered 370 ft. of clean oil after 1½ hours.

Cities Service Oil Co. is installing pump for completion of its Lansing-Kansas City discovery in Pawnee County about 4 miles north of Macksville. The well, 2-B Becker, SW NE NW 32-23s-15w, flowed 257 bbl. of oil in 6½ hours through a 5/16-in. choke from perorations at 3,743-69 and 3,777-83 ft. Cities Service recently completed an Arbuckle gas discovery in the immediate area.

Stafford County got another indicated discovery when Petroleum, Inc. 1 Ward, NE SW NE 15-23s-13w, 3 miles northeast of St. John Townsite pool, recovered 270 ft. of free oil and 120 ft. of muddy oil on a drill-stem test of the Arbuckle at 3,811-19 ft. A 30-minute test of the interval 3,810-14 ft. recovered only 10 ft. of mud. Casing has been cemented at 3,810 ft. in this indicated discovery.

At an assured Lansing discovery in Decatur County, Continental Oil Co. is running casing at its 1 Feely, SE SE SW 2-5s-27w. This wildcat, 3 miles southwest of Jennings pool and 2 miles north of Hardesty pool recovered 1,080 ft. of oil with 1,130 psi. bottom-hole pressure and 400 psi. flowing pressure on a 30-minute drill-stem test of the Lansing at 3,603-30 ft. The well was carried to a depth of 4,040 ft., but subsequent drill-stem test recovered only salt water.

In Rooks County, Lewis Drilling Co. 1 Kemmler, NW NW SE 7-6s-17e, has run casing to 3,366 ft. to test the Lansing which yielded 135 ft. of heavily oil-cut mud on a 1-hour drill-stem test at 3,216-43 ft. This wildcat is about 1 mile southeast of abandoned Faubion pool.

KANSAS WILDCAT FAILURES

Barton County: C. E. Ash et al 1 Heinz, SE SE NW 34-18s-11w, dry, TD 3,455 ft.

C. Todd 1 Alefs, SW NW SE 14-19s-14w, dry, TD 3,496 ft.

Honaker Drilling Co. 1 Hall, NE NE NE 28-19s-14w, dry, TD 3,550 ft.

Hilton 1 Birzer, NE SE NE 6-20s-12w, dry, TD 3,432 ft.

Butler County: Keener and High-Eckland Drilling Co. 1 Leapply, SE SW NE 31-28s-3e, dry, TD 3,000 ft.

Chase County: R. Mendenhall 2 Piper, SW NW NW 14-20s-9e, dry, TD 2,480 ft.

Cowley County: Smitherman & Cohen 1 G. B. Brown unit, NE SE NE 1-35s-3e, dry, TD 3,319 ft.

Decatur County: J. M. Huber 1 Railsback, SE SE NE 5-2s-26w, dry, TD 3,790 ft.

Midstates 1 Danley, SE SE SW 24-5s-27w, dry, TD 4,230 ft.

Ellis County: Lindas 1 Nickles, NW NW SE 19-12s-19w, dry, TD 3,920 ft.

Jones, Shelburne & Farmer et al 1 Midlekauf, NE NE NW 5-13s-19w, dry, TD 3,843 ft.

Franklin County: P. L. Edward et al 1 Bitts-Cramer, SW SW SW 26-16s-18e, dry, TD 1,410 ft.

Graham County: Palmer Oil Co. 1 Noah, SE SE SE 33-10s-21w, dry, TD 3,935 ft.

Greenwood County: W. McGinnis 1 Lewis, SW SE NW 15-25s-9e, dry, TD 2,222 ft.

Lyon County: Stanolind Oil & Gas Co. 1 Christensen, SW SW NW 9-17s-11e, dry, TD 3,015 ft.

Osage County: Cities Service Oil Co. 1 Dilworth, NW NW SW 7-15s-17e, dry, TD 2,202 ft.

Pratt County: Lindas 1 Lunt, NW NE NW 5-28s-12w, dry, TD 4,540 ft.

Reno County: Glickman-Finston 1 Ediger, SW SW NW 18-22s4w, dry, TD 3,965 ft.

Rice County: Beardmore-Barbara 1 Loesch, NW NW NW 26-20s-10w, dry, TD 3,420 ft.

Rooks County: Mallonee Drilling Co. 1 Hindman, NW NW NW 24-8s-18w, dry, TD 3,587 ft.

GMR 1 Shephard, SE SW NE 25-10s-18w, dry, TD 3,675 ft.

Sheridan County: Herndon Drilling Co. 1 Barnett, NW NW SE 5-7s-26w, dry, TD 4,512 ft.

Stafford County: Petroleum, Inc. 1 Hamilton, NW NW SE 10-23s-13w, dry, TD 3,961 ft.

M. B. Armer 1 Smolick, NE NE SW 24-23s-13w, dry, TD 3,969 ft.

Central Area

ILLINOIS FIELDS

Noah Petroleum Co. 1 Harry J. Smith, NW NE NW 13-2s-10e, Edwards County, is preparing to shoot the Aux Vases sand from 3,065-77 ft. On test the well swabbed oil at the rate of 120 bbl. daily, opening a new area ¾ mile from production.

Indiana Farm Bureau 1 Noah Duke, NW NE SE 14-2s-9e, is on production test of the McClosky lime at 3,391-3,400 ft. Total depth of the well is 3,460 ft. Oil was swabbed at the rate of 144 bbl. daily. The 1 Noah Duke is located 7 miles west of Albion, 1 mile from other oil wells, in Wayne County.

INDIANA FIELDS

George S. Engle 1 Oscar Ries, SW NE SE 22-7s-14w, Posey County, is swab testing oil at the rate of 105 bbl. daily from Cypress sand at 2,375-84 ft. Total depth of the well is 2,384 ft. The well is located 2 miles southwest of Mt. Vernon, ½-mile outpost from production.

C. E. O'Neal and Co. and O. B. Trotter 1 Darwin T. Woods, SE NW SW 9-3s-11w, Gibson County, is cleaning out after perforating casing opposite the Aux Vases lime at 2,371-76 ft. Total depth is 2,514 ft. A drill-stem test at 2,368-74 ft. gassed in 30 minutes, flowed clean oil in 40 minutes. The well is ½ mile from production and 2 miles east of Owensville.

WESTERN KENTUCKY

J. O. Miller Oil Co. and Ashland Oil & Refining Co. are pumping at the rate of 192 bbl. of oil per day after a 60-qt. shot at 1 Argyle Faith, 23-O-26, Daviess County, 4 miles northeast of Beech Grove and more than a mile from other production. Production is from the Cypress (Barlow) sand at 2,015-29 ft., total depth 2,118 ft.

John Tuttle & Max Lewis 1 E. C. Liles, 20-N-23, Webster County, is on production test of the McClosky lime at 2,675-94 ft. The well flowed 504 bbl. of oil during the first 24 hours, being the best well in the area to date. The producer is located 3 miles west of Sebree.

EASTERN KENTUCKY

A. V. Hoenig and Ashland Oil & Refining Co. have completed 1 Martin Collingsworth on Johns Creek northeastern Floyd County for an initial potential of 25 bbl. of oil daily from Mississippian lime at a total depth of 1,697 ft. Well is a quarter-mile east

The Drilling Contractor's *Crewmen*

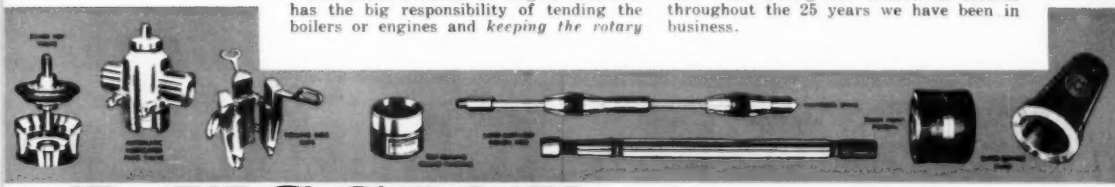
These are the men . . . the Derrickman, the Boiler Fireman or Engine Mechanic, and the floormen . . . who do the hard manual labor involved in drilling wells, and who, incidentally, are the Drillers, Tool Pushers, Drilling Superintendents and Drilling Contractors of the future. They are learning the complex technique of modern well drilling *the only way it can be thoroughly learned* . . . by actual experience.

The Derrickman is assistant-driller. When the rig is "on trip" he works high in the derrick on the "monkey board," guiding and racking the pipe. At other times he discharges the important task of conditioning and checking the drilling mud.

The Boiler Fireman or Engine Mechanic has the big responsibility of tending the boilers or engines and *keeping the rotary turning!* Another part of his job is maintenance of equipment.

The remaining crewmen work at the rotary table operating slips and tongs, when the rig is "on trip." At other times they handle a hundred miscellaneous duties on and around the rig.

These are the men who know MISSION Equipment "first-hand!" They know that MISSION "Rolling Dog" Slips are fast, sturdy, safe! That MISSION Slush Pump Parts insure efficient, economical pump operation. Drilling crewmen the world over have been among our staunchest friends throughout the 25 years we have been in business.



MISSION MANUFACTURING CO.

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Here's all you need for field assembly

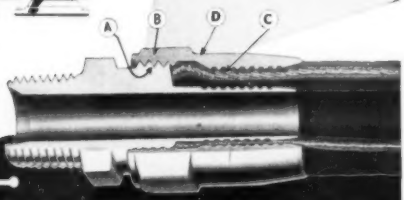
Oil-can

Wrench

Vise

HOW ANCHOR'S PATENTED REUSABLE COUPLING GRIP WORKS:

The thread on the body of the insert (A) and on the shell (B) is designed to insure positive engagement and minimize stripping. Our patented grip provides a uniform compression area (C) and additional packing of the hose in recess (D).



ANCHOR 2 piece Reusable Couplings

Makes Field Service Quick and Easy!

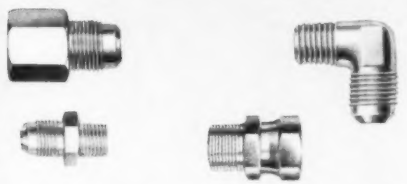
You'll really go for the convenience of Anchor Reusable Couplings. Assembly and disassembly, in the field is quick and easy. No special tools required. Downtime kept to a minimum.

Couplings can be used again and again. You need no expensive inventories of prefabricated hose assemblies in varying lengths.

And the patented grip of Anchor Reusable Couplings gives an extra margin of safety against leaks and blowoffs.

Use Anchor Couplings — couplings that stand up to the most rugged field conditions . . . make servicing easy . . . reduce downtime . . . cut inventories. Write for latest bulletin.

OG-81



Straight adapters, 90° elbows, adapter unions and related fittings make piping easier.

Also factory-assembled ductile sleeve couplings and field-service clamp-type couplings.

ANCHOR COUPLING CO. INC.

Factory: Libertyville, Ill. • Branch: Detroit, Mich

W&T altimeters--

the *Shortcut*

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RANGE — Ranges of 2,000 feet, 7,000 feet, and 15,000 feet are standard. Special ranges are available to order.

DURABILITY — The mechanism is simple and free of intricate design features. It is shock-proofed in the instrument case.

PERFORMANCE — W&T Altimeters rival the accuracy of the finest laboratory standards for measuring pressure — their performance is guaranteed.

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PRODUCTS, INC.

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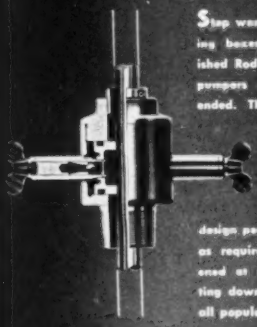

Stop worrying about leaky stuffing boxes. Install Kinzbach Polished Rod Stuffing Boxes on your pumpers and your worries are ended. They are plastic packed with a floating, self aligning gland and hold positive seals under the toughest conditions. Unique design permits plastic to be added as required or seal to be tightened at any time without shutting down the well. Available for all popular sizes of polished rods.

KINZBACH TOOL CO., Inc.

P. O. BOX 277 • HOUSTON, TEXAS

EXPORT OFFICE: 74 Trinity Place, New York, N. Y.

KINZBACH TOOL CO INC

extension to Johns Creek pool. Well was acidized with 2,000 gal.

In the Big Sandy gas field United Fuel Gas Co. have completed 30 Kentland Coal & Coke Co. for an open flow potential of 273,000 cu. ft. of gas daily from the Berea and Devonian black shale sections. Total depth of well is 4,266 ft.

MICHIGAN

What appeared to be an important Richfield oil strike, and probably the biggest potential discovery news to come to the Michigan industry this year, was ready for test this week at Sun Oil Co. 1 Iutzi et al, NW SW SW 5-19n-3w, Hamilton Township wildcat, Clare County.

The Iutzi was tested in the Richfield on drill-stem at 5,126-5,239 ft. Tester was open for 5½ hours. Gas showed in 7 minutes. When tester was pulled, drill-pipe showed 3,000 ft. of free oil, 897 ft. of mud-cut oil and 180 ft. of water. Bottom hole pressure was recovered at 2,569 lb. after 30 minutes. Trapped oil in drill-pipe flowed into pits when joints were broken and it was believed that well would have filled and flowed on test if the testing period had been extended for just a bit longer. Compared with other Richfield producing areas, the showing at this well on drill-stem test offered excellent prospects of being developed into an important new area. Hole was cored to 5,380 ft. total depth, and then well was cased with 5-in. Completion will be delayed until clean-cut cable unit can be moved in.

This new wildcat well is located about a mile southeast of West Hamilton Dundee oil pool and is about 3½ miles northwest of the famous McKenna well in the same township. The nearest Richfield dry hole is located about 2¼ miles to the southeast. The general area is spotted with shallow test wells and the area also has been cored. Although the 1 Iutzi does not appear to be on the top of the Dundee structure, well is up on this structure which trends diagonally northwest and southeast through Frost (T20N, R4W) and Hamilton townships, Clare County. The bulk of the acreage in this area is under lease to Sun Oil Co.

ILLINOIS WILDCAT FAILURES

Clay County: C. E. Brehm 1 Southard-Walker Comm., SW SW NW 28-3n-5e, dry, TD 2,905 ft.
De Witt County: Ted Meyers 1 Fink, NE NE SE 25-19n-1e, dry, TD 2,003 ft.
Fayette County: Producers Oil 1 Anna Aylward, NE NW 22-9n-1w, dry, TD 2,821 ft.
Madison County: Noah Petroleum 1 Amelia Hirschi, NW NE SE 10-4n-5w, dry, TD 2,132 ft.
Richland County: Calvert Drilling Co. 1 O. Forney, NW NW SW 10-2n-14w, dry TD 3,171 ft.
Aurora 1 R. P. Combs, NE SE NW 34-5n-10e, dry, TD 2,970 ft.
Washington County: G. S. Engle 1 D. C. Kankel, NE NE SE 30-2s-1w, dry, TD 1,808 ft.

INDIANA WILDCAT FAILURES

Pike County: L. P. Galambos 1 E. De Mott, NE SE SW 35-1n-7w, dry, TD 2,702 ft.
Posey County: Loury-Markey 1 Walgrove, NW NE NW 10-5s-13w, dry, TD 3,045 ft.
Spencer County: W. H. Winfrey 1 K. K. Kenedy, NW NW SW 13-5s-5w, dry, TD 1,140 ft.
Sullivan County: F. B. Cline 1 Monon Coal Co., SE NE SW 34-9n-9w, dry, TD 1,434 ft.

MICHIGAN SUCCESSFUL WILDCAT

Muskegon County, Ravenna Township: R. W. Devine and J. W. Lang Co. 1 Rollenhagan, SW SW NE 29-9n-14w, Traverse 1,857 ft., pump 12 bbl. oil and 35 of water, after 500 gal. acid, TD 1,865 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Valley Township: Cook Drilling Co. A-2 U.S.A., NE SE NE 29-2n-14w, Traverse 1,300 ft., dry, TD 1,330 ft.
Bay County, Pinconning Township: J. E. Palensky & Sons 1 Redfern et al, SE SW SE 24-17n-4e, Dundee 2,834 ft., dry, TD 3,035 ft.
Charlevoix County, Wilson Township: Earl Bell 1 Fall, S½ NW SE 13-32n-6w, Richfield, 1,706 ft., dry, TD 1,861 ft.
Gratiot County, Elba Township: McClure Oil Co. 1 Amespoker, NE NE NE 8-9n-1w, Dundee 2,946 ft., dry, TD 3,205 ft.
Ottawa County, Crockery Township: Ford Oil Co. 1 Larson, NW SW SW 7-8n-15w, Traverse 1,724 ft., dry, TD 1,731 ft.
Van Buren County, Arlington Township: R. T. Jones 3 Tomcala, SE SW SE 24-2s-15w, Traverse 1,102 ft., dry, TD 1,105 ft.

Appalachian-Ohio

Maryland Reports Three Completions

PITTSBURGH.—In Garrett County, Maryland, three completions were reported; One producing gas from the chert, and two resulting in dry holes in the Oriskany sand. W. H. & A. A. Rader 1 Evangelical Church, 400,000 cu. ft. gas, chert 3,679 ft., TD 3,744 ft. Maryland Gas Co. 1 Stanley Smith, dry, Onondaga 4,075 ft., chert 4,102 ft., Oriskany sand 4,231 ft., salt water 4,287 ft., TD 4,287 ft. Oil Ventures, Inc. 1 George Beckman, dry, Onondaga 5,792 ft., chert 5,837 ft., Oriskany sand 5,929 ft., salt water 6,008 ft., TD 6,008 ft.

West Virginia.—Portland district, Preston County: Hope Natural Gas Co., completed 9694 Leonie Burrows, elevation 2,061 ft., gaging 179,000 cu. ft. gas, after 2nd Stratofrac treatment, chert 4,915 ft., Oriskany sand 5,273 ft., gas 5,274, 5,405 and 5,413 ft., TD 5,788 ft. This company will run a Stratofrac treatment in 9676 Sarah J. Creamer. Drilling was stopped at a depth of 5,713 ft., Oriskany sand 5,243 ft., gas at 5,244-5,255 ft., testing 379,000 cu. ft. Williamsburg district, Greenbrier County, Deept Rock Oil Corp. 1 Bertha H. Thornbury et al, elevation 2,420 ft. is running 5½-in. casing at 6,359 ft. The chert was recorded at 6,323 ft. with a show of gas at 6,353 ft.

Southwest Pennsylvania.—Unity Township, Westmoreland County: Peoples Natural Gas Co. 4003 A. J. Dotterway, elevation 2,094 ft., is drilling at 7,945 ft., No. 4008 J. R. Frola, drilling at 250 ft.

MARYLAND SUCCESSFUL WILDCAT

Garrett County: W. H. & A. A. Rader 1 Evangelical Church, 400,000 cu. ft. gas, chert 3,679 ft., TD 3,744 ft.

MARYLAND WILDCAT FAILURES

Garrett County: Maryland Gas Co. 1 Stanley Smith, dry, Onondaga 4,075 ft., chert 4,102 ft., Oriskany sand 4,231 ft., salt water 4,287 ft., TD 4,287 ft.
Oil Ventures, Inc. 1 George Beckman, dry, Onondaga 5,792 ft., chert 5,837 ft., Oriskany sand 5,929 ft., salt water, 6,008 ft., TD 6,008 ft.

OHIO

The Waverly Oil Works 1 Harold Bowers, Section 4, extends the pool in Washington Township, Hocking County, a quarter mile to the west. Clinton at 2,788-93 ft. gaged 170,000 cu. ft. and increased to 1,900,000 in the second sand, logged at 2,793-2,803 ft.

Allen Willey at al 1 Guy Dugan, Section 15, Jackson Township, Knox County, showed for 6 bbl. natural and 50 bbl. in 24 hours after a 100-qt. shot. The same operator completed the 5 Caldwell - Currie in Lot 23, Hopewell Township, Licking County, as a 65 bbl. well. Clinton at 3,036-81 ft. had a good oil showing natural and was shot with 120 qts.

Two semi-wildcats are drilling in Cass Township, Muskingum County. The Mutual Oil and Gas 1 E. R. Johnson, Lot 6, and the Mid East Oil 1 W. E. Moyer, Lot 33.

OHIO SUCCESSFUL WILDCATS

Medina County, Montville Township: Ohio Fuel Gas Co. 1 T. C. Herwig, Clinton 3,365-90 ft., 305,000 cu. ft., TD 3,483 ft.
Richland County, Washington Township:

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Debentures. The offer is made only by the Prospectus.

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Service Pipe Line Company

Wholly-owned subsidiary of Standard Oil Company (an Indiana corporation)

Thirty Year 3.20% Sinking Fund Debentures, due April 1, 1982

Dated April 1, 1952 *Due April 1, 1982*

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Price 100% and Accrued Interest

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STONE & WEBSTER SECURITIES CORPORATION *WHITE, WELD & CO.*

April 16, 1952.

Fierbaugh and Ringler 1 Walter Burry, Sec. 12, Clinton 2,457-81 ft., 100,000 cu. ft. TD 2,561 ft.

Rocky Mountain

Pennsylvanian Shows Logged In Denver-Julesburg Basin

DENVER.—There has been added interest during recent weeks in the possibility of oil and gas production from the Pennsylvanian in the Denver-Julesburg area. Although shows of oil have been encountered in previous wells drilled through that formation, no commercial production has resulted, with all present production in the basin from the lower Cretaceous sands. Recently Ohio Oil Co. drilled a granite failure in Huntsman pool, Cheyenne County, Nebraska, for the first deep test within an oil and gas producing field in the newly discovered fields on the east flank of the basin.

During the past week shows were found, but no commercial tests reported, on three deep wildcats. George Livermore made a drill-stem test at 1 Green, C SW NE 8-2s-43w, wildcat in Yuma County, Colorado, between 4,664-75 ft. and recovered a small amount of mud with dead oil shows. Superior Oil Co. had shows in the Pennsylvanian at 1 State, C SE SE 16-18s-46w, Eads area, Kiowa County, in the southern part of the basin, but the recovery was 1,350 ft. of sulfur water and some mud. Topeka was topped at 3,374 ft. in this well. The Chicago Corp. and Republic Natural Gas Co. in their first deep operation in the basin were reported to have shows, but these were not confirmed. The well is 1 Scheetz, SE SE SW 11-3s-51w, Washington County, on a farmout deepening from Carter Oil Co., and the operator is now below 6,700 ft. Also of importance is the Shell Oil Co. 16 C. F. Green "A," NE NW NW 30-9n-53w, the first deep test in Mount Hope pool, Logan County. This well topped Permian at 5,695 ft., Big Blue 6,260 ft. and is drilling below 6,500 ft. The well is to go to granite.

The Plains Exploration Co. 1 Luft, SW NE SW 17-8n-53w, new "D" sand discovery in southwestern Logan County, flowed 18 bbl. of oil per hour for an initial from the zone 4,844-56 ft. "J" sand was topped at 4,948 ft. with the "D" sand 4,837 ft. Sinclair Oil & Gas Co. had an excellent extension and new-pay discovery in the West Padroni area, Logan County. Well 1 Sindt, SE SE SW 31-10n-52w, was drilled to 4,873 ft. and made oil on drill-stem test of both the "D" sand and "J" sand. The "D" sand in the discovery well had only shows of gas.

Carter Oil Co. has abandoned the 1 West Poplar, C NW SW 18-29n-50e, wildcat in the West Poplar area, Roosevelt County, Montana. The well was drilled to 7,675 ft., total depth, with Devonian topped at 7,500 ft. The well failed to find production in the Charles-Madison zones, productive at the C. H. Murphy, Jr., wildcat at East Poplar. Carter drilled this well through Dakota a year ago and later started deepening operations. This is the first failure in the current wildcat series through northeastern Montana since the Shell Oil Co. discovery of production in the Charles in the Richey area, northern Dawson County.

Several North Dakota wildcats are at important depths, with no shows of oil or gas reported. Stanolind Oil & Gas Co. is drilling below 7,250 ft. at 1 Long Lake, C SW SW 28-150n-80w, McLean County. The well found Kibbey at 4,765 ft. and additional tests below that depth have shown salt water. The zone 6,950-7,013 ft. made 450 ft. of drilling mud and salt water in 3 hours. H. L. Hunt 1 Wald, C SE SW 23-155n-81w, Ward County, found Charles at 4,540 ft. and Madison 4,754 ft. and is drilling below 8,629 ft. Wannette Oil Co. 1 M. O. Lee, C NE NE 24-156n-85w, wildcat in Ward County, found Charles at 5,070 ft. and is drilling below 5,125 ft. H. L. Hunt 1 Lanertz C NW SE 17-153n-77w, McHenry County wildcat, is drilling below 4,900 ft. with Madison reported at 3,880 ft. In the McKenzie-Williams county Nesson dome area Amerada Petroleum Corp. is making completion tests on three wildcats. Well 1 Risser, C SW SE 12-149n-96w, is testing after flowing 140 bbl. of oil and four of water in 7 hours through ¼-in. choke and 17 hours through ½-in. choke, with production from Madison. The well also flowed oil from the Devonian. The Keene Area 1 Halverson, C NE SE 26-152n-96w, McKenzie County, is making sulfur water with shows of oil from the Madison and Amerada is continuing to plug back and test. In the Tioga area, north of Beaver Lodge, Amerada 1 Bakken, C SW NW 12-157n-95w, is testing after flowing 50 bbl. of oil in 6 hours through 12/64-in. choke from Madison.

COLORADO WILDCAT FAILURE

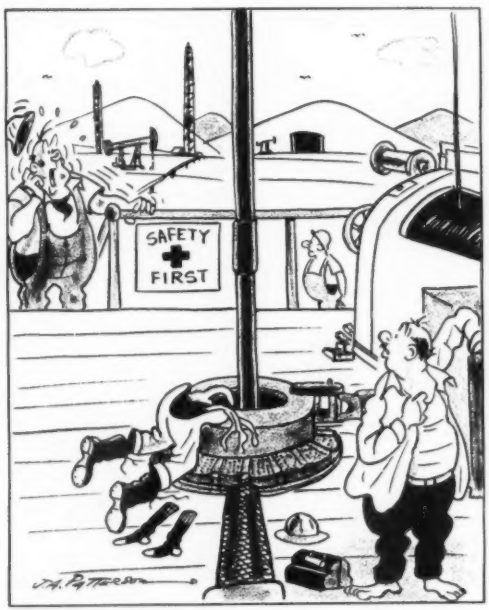
Logan County: McDermott & Barnhart 1 Fehringer, SW SW SW 34-12n-52w, dry, TD 5,668 ft., "J" sand 5,228 ft., Lakota 5,468 ft., Morrison 5,535 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Banner County: Cooperative Refining Association 1 W. W. Downer, SE SE NE 11-18n-56w, dry, TD 6,175 ft., 1st sand 5,971 ft., Muddy 6,097 ft., Skull Creek 6,166 ft.

Cherry County: Perl Smith 1 Krell, SE SW NE 19-33n-40w, dry, TD 4,357 ft., Red Beds 3,170 ft., Granite Wash 4,261 ft., Granite 4,356 ft.

Keith County: Argo Oil and True & Brown 1 Fenstrom, C NW NW 24-14n-41w, dry, TD 3,550 ft., "D" sand 3,223 ft., "J" sand 3,330 ft., Skull Creek, 3,585 ft., Cloverly 3,543 ft.



THE OIL AND GAS JOURNAL

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South Louisiana

Magnolia Testing Up Hole At Deep Allen Wildcat

NEW ORLEANS.—Due to mechanical difficulties, Magnolia Petroleum Co. 1 Ragley Lumber Co., deep wildcat in Allen Parish, will probably not be completed in the indicated gas sand below 18,000 ft. During preparations to test at near total depth of 18,680 ft., the pre-perforated liner apparently clogged and operator was never successful in testing the venture. Operator has now come up the hole to test at 14,788-14,810 ft. and has squeezed top of the liner preparatory to testing.

In Beauregard Parish, same operator is drilling below 11,630 ft. in its prospective discovery well, 1 Four C. unit, 32-3s-9w. Mechanical difficulties were also encountered in this venture, which forced the firm to come up the hole and cut a casing window at 11,482 ft. in order to sidetrack. The venture will be carried to at least 11,900 ft. where gas and possible gas-distillate shows were found. The well was originally drilled to 14,228 ft.

The California Co. 1 George Montgomery, 85-12s-19e, Calcasieu Parish wildcat, flowed salt water from perforations at 9,713-17 ft. where an oil sand had been indicated. A previous test around 10,300 ft. recovered gas-condensate, and it is believed that the venture will be completed at this depth.

The Texas Co. is still attempting to complete its outpost well at Happytown field, St. Martin Parish. The venture, 1 Consolidated Companies, 108-7s-8e, flowed pipeline oil from perforations at 9,796-9,802 ft. The well mudded up and operator squeezed. Perforations were then effected at 9,675-82 ft. and operators are swabbing.

Testing operations are still under way at Superior Oil Co. 1 Rockefeller-State Lease 2038, 4-16s-3w, discovery prospect in the Deep Lake area of Cameron Parish. Four possible gas-distillate zones were logged in the wildcat.

Meanwhile, Superior has staked location for a second test southwest of the 1 Rockefeller. New venture is 2 Rockefeller in 3-16s-3w.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Plaquemines Parish: oil discovery—Main Pass Blk. 33—The Texas Co. 1 St. Le. 957, offshore in Main Pass Blk. 33, TD 9,294 ft., perf. 7,849-58 ft., IP 149 bbl. oil per day, ¼-in. choke, 28.7° gravity.

Terrebonne Parish: oil discovery—Cities Service Oil Co. 1 Delta Securities Co., 37-7s-18e, TD 12,973 ft., perf. 12,675-85 ft., IP 71 bbl. oil per day, 13/64-in. choke, 45° gravity, TP 5,090 psi.

SOUTH LOUISIANA WILDCAT FAILURES

East Baton Rouge Parish: Circle Drilling Co. 1 W. J. Decker, 7-5s-1w, dry, TD 13,005 ft.

Plaquemines Parish: The Texas Co. 1 St. Le. 1950, Blk 15, in Main Pass, Blk. 22 area, dry, TD 9,765 ft.

St. John the Baptist Parish: Houston Oil Co. of Texas 1 St. Le. 1838, 16-13s-19e, dry, TD 12,447 ft.

West Baton Rouge Parish: Deep South Oil Co. 1 Southern Land Products, 35-6s-10e, dry, TD 10,519 ft.

Canadian Fields

(Continued from page 143)

EASTERN CANADA

Nova Scotia.—Announcement has been made by the Provincial Industry Department at Halifax that natural gas has been found in Nova Scotia for the first time by geologists drilling salt and limestone deposits near Antigonish. The discovery was made at South Side, Antigonish Harbor, about 10 miles from the town, at about 400 ft. depth. Operations were in charge of Dr. Don J. O'Neil, geology professor at St. Francis Xavier University. Dr. O'Neil while conceding the possibility of oil and gas development, warned that the discovery might not prove commercial.

Ontario.—In Aldborough township, Elgin County, Western Ashley Minerals No. 1 on the Tom Morrison farm is below 1,050 ft. with 7-inch casing set and a dry hole. A second test has been located in Sombra Township, Lambton County, between Port Lambton and Sombra village.

In Gosfield Township, Essex County, the Harry B. Smith syndicate is cleaning out an old Trenton limestone well drilled some years ago on the Mowat Wigle farm at Albertville. The hole is dry at 3,100 ft. and still drilling.

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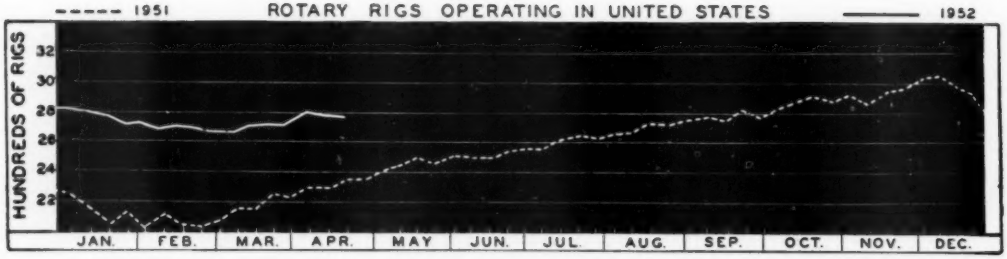
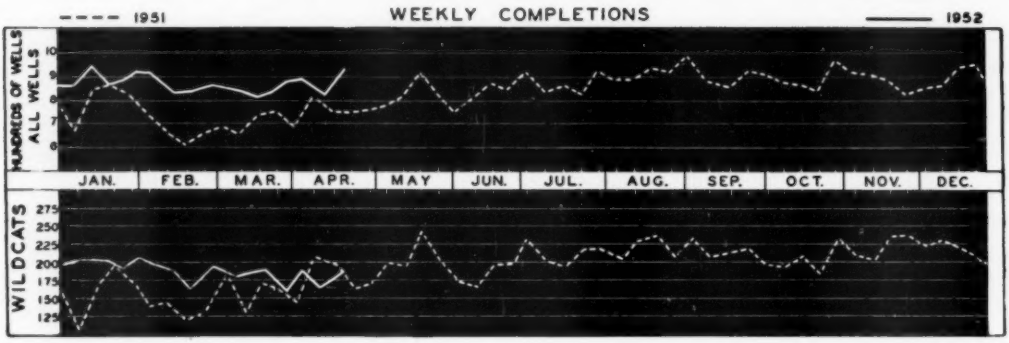
UNDERWOOD CORPORATION
ONE PARK AVE., NEW YORK 16, N. Y.





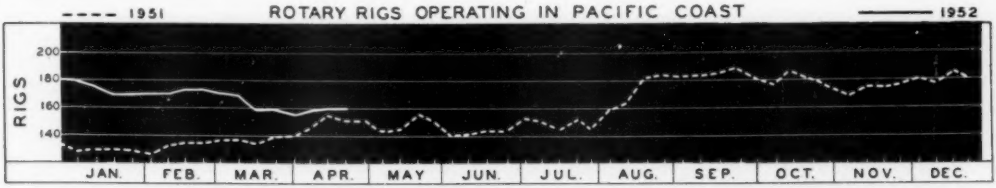
CURRENT STATISTICS

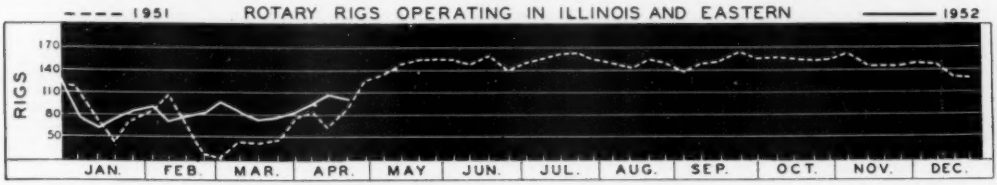
EXPLORATION

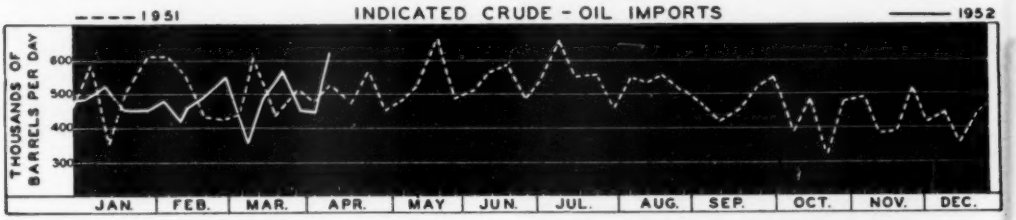
WEEKLY WELL COMPLETIONS . . . WEEK ENDED APRIL 19, 1952

	Total of all wells					Apr. 19		Wildcat completions and discoveries										
													Cumulative total, 1952					
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	19	9	0	*10	25,000	171	61	0	0	0	0	0	0	0	0	0	0
Pennsylvania	38	16	6	†16	77,660	482	240	0	0	0	0	0	0	0	0	2	2
West Virginia	14	1	11	2	52,381	205	177	0	0	0	0	0	0	0	2	1	3
Ohio	20	10	2	‡8	41,895	258	226	0	0	2	0	2	0	0	4	0	4
Indiana	13	5	0	8	24,692	310	276	0	0	0	4	4	11	0	2	99	112
Kentucky	17	5	2	10	36,105	358	229	0	0	0	0	0	8	0	0	61	69
Illinois	27	7	0	20	70,382	427	455	0	0	0	7	7	7	0	0	107	114
Michigan	14	3	1	10	33,025	195	202	1	0	0	6	7	9	0	1	70	80
Kansas	96	35	8	§53	319,534	1,486	1,216	0	0	0	24	24	30	0	4	243	277
Nebraska	5	2	0	3	24,670	74	99	0	0	0	3	3	2	0	0	41	43
Oklahoma	112	59	5	§48	403,338	1,885	1,636	3	0	0	13	16	32	1	6	195	234
Texas	379	246	11	122	1,726,643	5,403	4,774	20	2	4	67	93	250	25	36	1,127	1,438
N. Central (Dist. 7-B & 9)	120	67	1	52	334,389	1,661	1,440	14	0	1	30	45	143	1	11	480	635
West (Dist. 7-C & 8)	118	97	0	21	699,773	1,676	1,463	2	0	0	11	13	45	0	3	192	240
Panhandle (Dist. 10)	14	7	4	3	53,201	206	210	0	0	0	2	2	1	0	2	19	22
Eastern (Dist. 5 & 6)	14	12	0	2	82,281	279	344	0	1	0	2	3	10	3	0	64	77
Gulf Coast (Dist. 2 & 3)	37	19	1	17	211,542	798	660	0	0	1	6	7	31	13	9	157	210
Southwest (Dist. 1 & 4)	76	44	5	27	345,457	783	657	4	1	2	16	23	20	8	11	215	254
Louisiana	60	37	2	21	406,480	689	591	2	0	0	7	9	14	6	3	73	96
Northern	31	19	1	11	99,852	372	280	0	0	0	3	3	6	0	3	30	39
Southern	29	18	1	10	306,628	317	311	2	0	0	4	6	8	6	0	43	57
Arkansas	11	5	0	6	41,365	116	112	0	0	0	2	2	4	0	0	16	20
Mississippi	9	3	0	6	69,094	123	72	1	0	0	2	3	6	1	1	44	52
Southeastern States	0	0	0	0	0	15	15	0	0	0	0	0	1	0	1	9	11
Montana	0	0	0	0	0	53	62	0	0	0	0	0	2	0	0	14	16
Wyoming	12	10	0	2	59,357	197	202	0	0	0	0	0	10	0	2	30	42
Colorado-Utah	8	6	0	2	42,663	154	77	0	0	0	1	1	7	0	4	47	58
New Mexico	17	7	6	4	72,825	290	198	0	0	0	2	2	9	0	1	23	33
California	54	45	1	8	230,749	787	590	2	0	1	8	11	33	0	1	141	175
North Dakota	1	1	0	0	8,596	6	2	0	0	0	0	0	1	0	0	2	3
Miscellaneous (Mo., Md.)	4	0	1	3	14,997	22	11	0	0	1	2	3	0	0	6	9	15
Total United States	930	512	56	362	3,781,451	13,706	11,514	29	2	8	148	187	436	33	74	2,354	2,897
Total previous week	822	446	49	327	3,433,954			20	2	2	143	167	407	31	66	2,206	2,710
Total April 21, 1951	754	419	29	306	2,826,535			21	1	3	144	169	398	23	77	2,036	2,534

Service wells included: *10, †13, ‡2, §1.





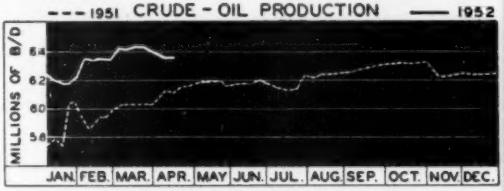


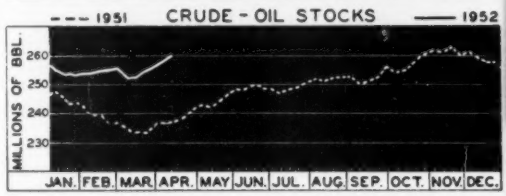
DAILY AVERAGE PRODUCTION FOR WEEK

	April 19, 1952			April 12
	Crude oil	Lease condensate	Total	total
Alabama	2,800		2,800	2,700
Arkansas	76,025	4,875	80,900	81,200
California	980,200		980,200	979,600
Colorado	83,600		83,600	83,500
Eastern	58,700		58,700	58,800
Florida	1,825		1,825	1,775
Illinois	167,200		167,200	167,200
Indiana	30,900		30,900	29,300
Kansas	315,200		315,200	320,500
Kentucky	35,600		35,600	35,600
Louisiana	623,000	39,300	662,300	662,150
North	112,500	14,300	126,800	126,650
South	510,500	25,000	535,500	535,500
Michigan	36,300		36,300	37,200
Mississippi	94,200	4,600	98,800	98,500
Montana	24,400		24,400	24,400
Nebraska	6,300		6,300	6,400
New Mexico	162,425	450	162,875	162,975
Oklahoma	531,200		531,200	528,600
Texas	2,842,850	45,325	2,888,175	2,888,175
Dist. 1	33,750	200	33,950	33,950
Dist. 2	161,075	3,825	164,900	164,900
Dist. 3	467,550	25,500	493,050	493,050
Dist. 4	261,250	4,500	265,750	265,750
Dist. 5	60,900	400	61,300	61,300
Dist. 6	121,375	4,425	125,800	125,800
E. Texas field	272,700		272,700	272,700
Dist. 7-B	89,500	100	89,600	89,600
Dist. 7-C	132,150	5,650	137,800	137,800
Dist. 8	998,425	275	998,700	998,700
Dist. 9	161,175	450	161,625	161,625
Dist. 10	83,000		83,000	83,000
Utah	3,950		3,950	3,900
Wyoming	192,500		192,500	192,000
North Dakota	800		800	
Total U. S.	6,269,975	94,550	6,364,525	6,364,475
Change from previous week, up			50	
Canada	149,155		149,155	98,980

Total U. S. production January 1-April 19 — 696,618,150 bbl.
Same period last year (crude plus cond.) — *659,470,450 bbl.

*Incl. 8,929,650 bbl. condensate.

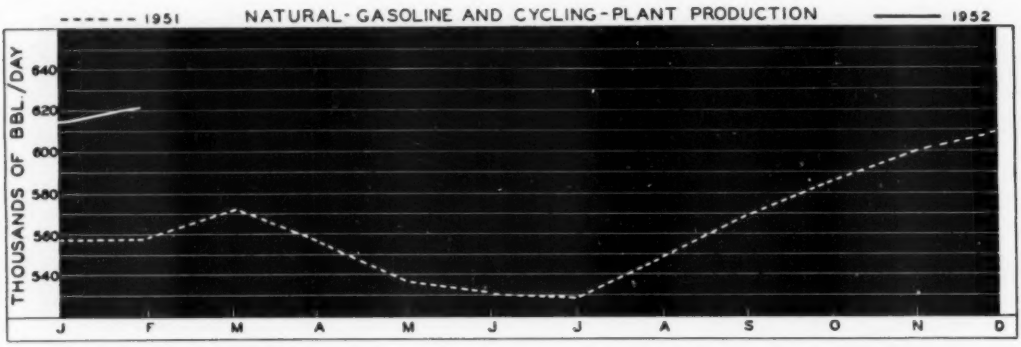


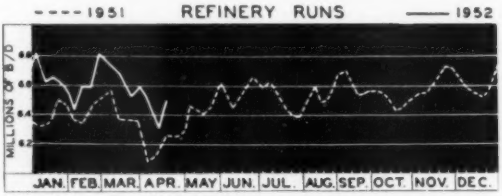


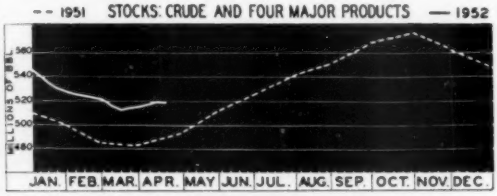
CRUDE-OIL STOCKS BY STATES OF ORIGIN*
(Thousands of barrels)

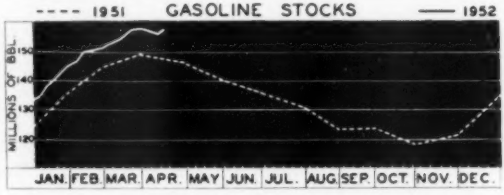
	Apr. 12, 1952	Apr. 5, 1952	Apr. 14, 1951
Pennsylvania Grade	2,321	2,399	2,078
Other Appalachian	2,112	2,113	1,486
Illinois, Indiana, Michigan	11,317	11,162	9,359
Arkansas	3,065	3,095	2,922
Louisiana	14,565	14,862	14,526
North	2,881	3,054	3,203
Gulf	11,684	11,808	11,323
Mississippi	3,432	3,465	3,087
New Mexico	7,529	7,492	7,114
Oklahoma and Kansas	40,277	39,328	36,748
Texas	123,692	123,738	109,603
East Texas proper	11,341	11,363	(†)
West Texas	54,908	54,924	(†)
Texas Gulf	26,173	25,493	(†)
Other Texas	31,270	31,958	(†)
Rocky Mountain	15,113	14,792	13,174
California	30,249	30,308	30,477
Foreign	7,026	5,696	6,532
Total	260,698	258,450	237,106

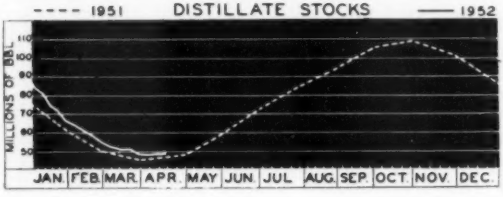
*Bureau of Mines. †Not comparable with current week.

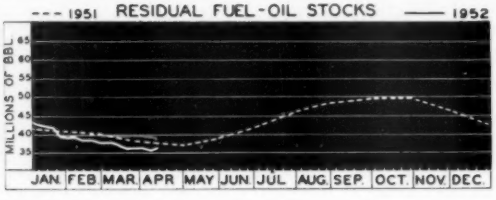










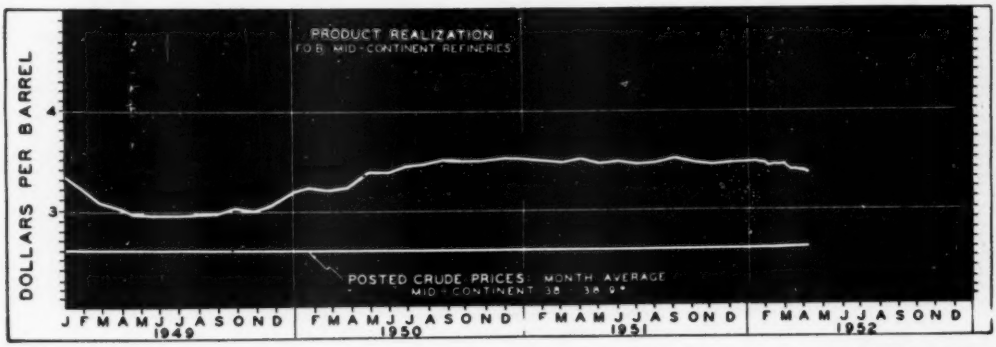


A.P.I. REFINERY REPORT, APRIL 19

(Thousands of barrels)

District—	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual	Bureau of Mines, April 1951: Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	981	395.4	49.0	218.7	237.6	32,115	7,425	15,554	9,998	962	360.2	47.5	208.2	211.5
Appalachian:														
Dist. 1	103	43.7	6.3	15.8	12.0	4,030	352	593	451	105	46.2	6.8	14.2	11.4
Dist. 2	59	35.7	4.1	9.9	10.7	1,943	172	326	198	76	36.6	4.8	12.1	15.2
Ind., Ill., Ky.	1,231	644.3	74.9	206.3	180.3	36,949	3,002	7,976	4,741	1,117	580.2	75.6	186.0	175.3
Okla., Kans., Mo.	497	265.3	19.9	94.3	65.6	18,114	1,014	7,380	1,348	494	262.2	18.6	107.6	62.3
Inland Texas	248	170.5	14.0	38.3	37.7	6,535	396	1,130	697	238	142.8	14.9	37.4	45.4
Texas Gulf Coast	1,642	708.7	144.6	379.6	272.0	24,336	2,600	6,320	6,224	1,484	645.3	130.2	300.3	243.8
La. Gulf Coast	533	247.6	57.0	122.7	68.3	7,985	1,249	2,321	1,789	481	218.2	64.0	104.7	53.9
N. La. and Ark.	80	30.7	7.4	24.4	5.9	3,073	597	719	144	84	32.1	8.4	14.6	8.3
Rocky Mountain:														
New Mexico	18	10.7		1.9	4.0	163		56	38	15	8.2	0.3	2.7	3.6
Other Rocky Mtn.	179	90.0	5.4	35.8	36.8	6,013	245	1,218	925	185	92.0	2.3	38.2	42.9
California	931	399.7	6.0	155.6	348.8	16,136	269	5,765	10,275	942	394.0	10.3	145.3	356.7
April 19, 1952	6,501	3,043.3	388.6	1,303.3	1,279.7	157,392	17,321	49,358	36,828	6,183	2,821.0	383.7	1,171.3	1,230.3
April 12, 1952	6,315	3,077.4	388.6	1,344.6	1,249.4	157,781	17,017	48,494	35,880					
April 21, 1951	6,265	2,865.7	396.9	1,167.4	1,228.7	147,305	16,132	46,606	36,748					

*At refineries including natural blended. †Finished and unfinished.



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.34 for week ended April 12, $3.36 for previous week, and $3.51 for April 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of April 23, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10-10¼	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11-11⅜	13.5-13.75	11¾-12
43-44 w.w. kerosine	8¾-9	10-10.1	9
No. 2 straw fuel oil	7¾-8	9-9.25	8
No. 6 residual	$1.35-1.45	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29
200 vis., No. 3 neutral, 0-10 pp.	16.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t., neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

LOWER tanker rates for the movement of crude and products from the Gulf Coast to the East Coast have removed one of the reasons for limited activity on the New York Harbor spot market. Current rates are holding at about Maritime Commission base plus 50 per cent. Several small dirty vessels were chartered at MC plus 35 per cent, but these were considered to be below the general market.

The reduction in tanker rates has brought the delivered cost of products in the New York Harbor area down to or slightly below ceiling prices of products. In most cases suppliers are now able to buy either light or heavy fuels on the gulf and sell them at barge prices in New York Harbor without taking a loss.

Both suppliers and resellers are expecting an increase in East Coast ceiling prices before the heating season opens next fall, but there is some difference of opinion on the probable effective date of the increase. Jobbers and distributors are trying to buy enough to cover summer sales before ceilings are raised. On the other hand, suppliers have not released much material on the open market since the products may have higher ceilings within a few weeks.

The Empire State Petroleum Association, a New York jobber and distributor organization, has asked the Office of Price Stabilization to hold off any adjustments in East Coast ceilings until October 1. Most of the members of this association buy on a delivered East Coast price basis and would like to build inventories during the summer at present ceilings.

Mid-Continent and North Central markets have changed very little in the past week. Some improvement has been reported in movement of gasoline but no changes in prices.

Lack of activity has been the only outstanding feature of kerosine and No. 2 fuel markets in the Mid-Continent. Open-market trading on residual fuel is very light.

A reseller on the Gulf Coast was reported looking for offers of material to go to the Gulf Coast. Since no prices were mentioned, most suppliers have considered it as a feeler for distress material.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$3.13
21-21.9	2.07	2.27	....	3.14
22-22.9	2.12	2.29	....	3.16
23-23.9	2.18	2.31	....	3.18
24-24.9	2.24	2.33	$2.56	3.20
25-25.9	2.30	2.35	2.58	3.22
26-26.9	2.36	2.37	2.60	3.24
27-27.9	2.41	2.39	2.62	3.26
28-28.9	2.46	2.41	2.64	3.28
29-29.9	2.52	2.43	2.66	3.30
30-30.9	2.57	2.45	2.68	3.32
31-31.9	2.62	2.47	2.70	3.34
32-32.9	2.68	2.49	2.72	3.36
33-33.9	....	2.51	2.74	3.38
34-34.9	....	2.53	2.76	3.40
35-35.9	....	2.55	2.78	3.42
36-36.9	....	2.57	2.80	3.44
37-37.9	....	2.59	2.82	3.46
38-38.9	....	2.61	2.84	3.48
39-39.9	....	2.63	2.86	3.50
40 and above	....	2.65	2.88	3.53

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.82
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.75
Illinois Basin	2.77

*37°-37.9°.

First Quarter Well Completions Up Over Same Period Last Year

John C. McCaslin

CUMULATIVE total completions for the first quarter of 1952 showed an increase of 1,592 wells over 1951, or 16 per cent. Oil-well completions were up 778, or 14 per cent. Gas completions showed an increase of 105, or 15 per cent. The total number of dry holes drilled was up 709, or 18 per cent. Footage drilled was up 8,851,982 ft., or 23 per cent.

March Vs. February

Total completions were up 272, or 8 per cent. Successful oil wells were up 172, or 8 per cent. The total number of gas wells was up 14, or 5 per cent. Operators drilled 86 more dry holes and took 25 wells below 12,500 ft. Footage drilled was up 928,568 ft. The West Coast and Southwest reported the only decline in completions.

California.—The Golden State reported 207 completions, down 9. Stevens zone oil production was added to the productive sands of the old Buena Vista Hills field, southwestern San Joaquin Valley.

Southwest.—Completions in Texas and New Mexico totaled 1,432, down 47. The first production in the Delaware basin below the Delaware formation was discovered in Culberson County, Texas.

Dakotas.—Completions in this area totaled four. The second Beaver Lodge well was completed at Amerada Petroleum Corp. 1 M. Iverson, extension 1 mile north of the Beaver Lodge discovery well in Williams County, North Dakota.

Southern.—Completions in Louisiana, Arkansas, Mississippi, and the southeastern states totaled 253, up 17. One of the most significant strikes in the southeastern area in several years was completed in Monroe County, Mississippi, proving to be a big gas-condensate well, producing from the Mississippian.

Rocky Mountain. — Completions in this area were up 37. C. H. Murphy, Jr., completed a dual producer at East Popular, Mont., in the Williston basin. A discovery at Hiawatha, Moffat County, Colorado, was completed flowing 11,000 M.c.f. of gas per day. The well, deepest ever drilled in Colorado, went to 15,041 ft.

Mid-Continent and North Central. —Well completions in Kansas, Nebraska, and Oklahoma totaled 924, or up 9 per cent. Successful oil wells were up 84, or 18 per cent. Oklahoma reported 21 successful new discoveries, Kansas 11. Completions in the Ohio - Indiana - Illinois - Kentucky-Michigan region were up 12 to a total of 471.

Alberta, Canada. — Completions in Alberta were up 10. The general Stettler region yielded its fifth Devonian oil discovery for Canadian Gulf Oil Co. within a 3-year period.

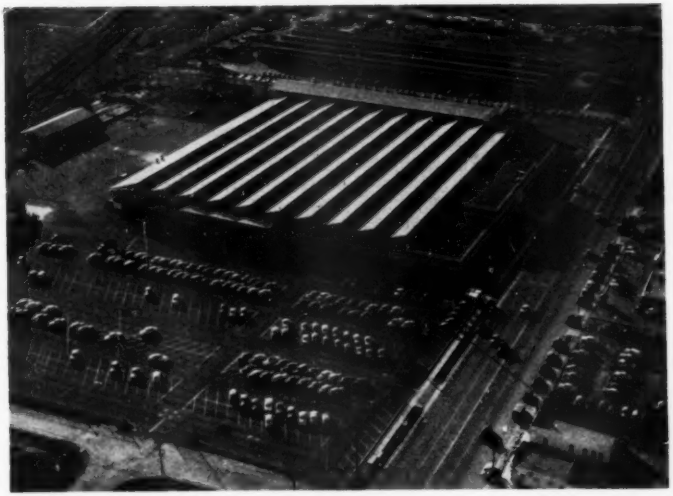
SUMMARY OF COMPLETIONS, MARCH 1952

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	74	37	0	37	74	0	0	0	0	0	100,150	55
Pennsylvania	150	63	24	63	133	16	0	1	0	1	310,675	155
West Virginia	51	9	37	5	25	24	1	1	0	0	144,742	201
Maryland	2	0	1	1	0	2	0	0	0	0	7,122	25
Ohio	78	25	16	37	42	36	0	0	0	0	166,464	141
Kentucky	98	33	20	46	62	36	0	0	0	0	205,968	177
Illinois	131	63	1	67	61	70	0	0	0	0	322,482	206
Indiana	102	30	1	71	86	16	0	0	0	0	181,848	144
Michigan	62	29	3	30	34	28	0	0	0	0	157,754	62
Kansas	432	226	19	187	44	382	5	1	0	0	1,470,461	490
Nebraska	21	7	0	14	1	16	3	1	0	0	95,876	32
Oklahoma	571	305	23	243	161	282	96	24	7	1	2,110,462	840
Texas	1,343	846	60	437	272	485	376	169	35	6	6,529,328	1,731
N. Central (Dist. 7-B & 9)	431	247	4	180	150	221	60	0	0	0	1,409,917	360
West (Dist. 7-C & 8)	413	336	3	74	40	92	196	64	16	5	2,491,652	685
Panhandle (Dist. 10)	64	29	24	11	11	52	1	0	0	0	189,487	94
Eastern (Dist. 5 & 6)	64	37	2	25	3	17	22	21	1	0	396,042	114
Gulf Coast (Dist. 2 & 3)	193	112	19	62	22	56	42	61	11	1	1,187,482	264
Southwest (Dist. 1 & 4)	178	85	8	85	46	47	55	23	7	0	854,748	214
Louisiana	191	122	16	53	46	37	20	35	42	11	1,255,849	259
North	108	63	16	29	46	35	14	10	3	0	402,564	100
South	83	59	0	24	0	2	6	25	39	11	853,285	159
Arkansas	27	17	1	9	3	20	2	2	0	0	101,557	44
Mississippi	30	7	1	22	0	1	23	5	1	0	205,193	24
Ala., Ga., Fla.	5	0	0	5	1	0	3	1	0	0	30,062	11
Montana	18	10	0	8	8	9	1	0	0	0	48,879	68
Wyoming	64	39	0	25	7	23	27	6	1	0	332,212	145
Colorado	39	20	4	15	0	7	31	0	0	1	218,891	60
Utah	8	2	0	6	2	0	4	1	1	0	43,858	40
New Mexico	89	45	33	11	20	33	12	14	6	4	468,486	247
California	207	164	2	41	59	75	46	11	14	2	927,357	264
North Dakota	4	2	0	2	0	0	1	3	0	0	32,711	17
Miscellaneous	§2	0	1	1	2	0	0	0	0	0	2,584	¶10
Total March 1952	3,799	†2,101	263	*1,435	1,143	1,598	651	275	107	25	15,470,971	15,448
Total February 1952	3,527	1,929	249	1,349	1,080	1,388	689	240	108	22	14,542,403	5,616
Total March 1951	3,452	1,883	239	1,330	1,075	1,446	568	228	118	17	13,844,402	4,779
Cumulative 1952	11,400	6,181	800	4,419	3,370	4,647	2,142	813	356	72	47,232,277	
Cumulative 1951	9,808	5,403	695	3,710	3,109	4,186	1,627	575	271	40	38,350,295	
Alberta, Canada:												
March 1952	127	68	10	49	19	49	56	2	1	0	555,566	
February 1952	117	74	7	36	15	44	53	4	1	0	524,058	200
Cumulative 1952	346	205	24	117	52	120	165	7	2	0	1,531,814	

*Incl. 129 service wells: N. Y. 36, Pa. 55, Ohio 4, Ill. 1, Kans. 12, Okla. 18, N. Cent. Tex. 2, N. La. 1. †Incl. 27 condensate wells: Okla. 3, W. Tex. 3, E. Tex. 6, Texas Gulf Coast 5, SW. Tex. 8, S. La. 2. ‡Incl. all wells rigged up and or drilling at month end. §Incl. 2 Mo. Total footage 2,584 ft. ¶Incl. S. D. 3, Mo. 3, Idaho, Ariz., Nev. 4.

EQUIPMENT MEN . . . in the News

Baker Oil Tools, Inc., Opens New Plant and Offices at Los Angeles



Aerial view of Baker Oil Tools' new home in Los Angeles.

R. C. Baker, Sr., founder and president of Baker Oil Tools, greets Smith Vroman, first superintendent of Baker's Coalinga plant and superintendent of the Huntington Park plant until 1929.

Ralph G. Garretson, left, technical adviser to the company's export department, and Ted Sutter, Baker general manager and executive vice president, discuss facilities of the new plant.

Baker Oil Tools, Inc., has formally opened its new home at Los Angeles conducting hundreds of petroleum industry guests on tours of the new factory and executive offices. On the following day open house was continued for stockholders and families of Baker employes.

Designed and built by Baker personnel to meet the company's particular needs, the new home is the third headquarters structure occupied by the company since its founding in 1913 as the Baker Casing Shoe Co. at Coalinga. The second home was at Huntington Park, opened in 1921. R. C. Baker, Sr., founder of the company, remains active as president.

The new facilities include the main factory and executive, engineering, material-control, accounting, and advertising offices of Baker Oil Tools, as well as the executive offices of Baker Transworld, Inc., a wholly-owned subsidiary. The shop occupies more than 160,000 sq. ft. while the office building has over 23,000 sq. ft. of floor space.

A steel production derrick is provided at the plant site so that the testing laboratory can continue its checking of Baker tools. Facilities are provided so that well conditions can be duplicated as nearly as possible, assuring that any tool which passes the tests imposed in the lab can be expected to function satisfactorily in the field.

In the United States, Baker operates a Western and a Central division. The Western division, with headquarters in Los Angeles, includes 11 branch offices in California and the Rocky Mountain area. The Central division with headquarters at Houston, includes 34 branch offices in the Gulf Coast and Mid-Continent areas.

Baker's main export office is located in Los Angeles, with branches in New York, Houston, Tulsa, and Dallas. The company is also represented in Trinidad, Argentina, and Mexico. Baker Transworld, Inc., carries on Baker's business in Eastern and Western Venezuela and in Canada. It maintains division offices in Anaco, Eastern Venezuela; Maracaibo, Western Venezuela; and in Calgary, Alta., Canada.

McCullough Tool Opens Two New Service Branches

ELMER MOODY

McCullough Tool Co. has announced the opening of two new service branches at Williston, N. D., and Vernal, Utah, making a total of 33 McCullough branches operating in major oil fields.

Elmer Moody, formerly Bakersfield, Calif., branch manager, has been made branch manager at Williston. Stan Hendrickson has been appointed manager of the

S. HENDRICKSON

FRANK SWEET

Vernal service branch. He was formerly assistant manager at the McCullough Ventura, Calif., service lo-

cation. Frank Sweet, formerly assistant service manager at the McCullough main plant and western division headquarters in Los Angeles, has been appointed branch manager at Bakersfield, replacing Moody.

Prior to the opening of these new branches, oil operators in the Williston and Uinta basin fields were serviced from the McCullough Casper, Wyo., Rocky Mountain division headquarters.

Ewing to Manage U. S. Steel Stainless Sales

J. S. EWING

The appointment of John S. Ewing as manager of stainless steel sales, United States Steel Co., has been announced by J. D. Darby, vice president of sales. Ewing succeeds Paul F. Voigt, Jr., who has retired after 16 years with U. S. Steel and 42 years in the steel industry.

Ewing joined U. S. Steel in 1936 as a salesman for Carnegie-Illinois Stainless Steel Division in Chicago. Following service in World War II he returned to the firm as a stainless steel-product representative in Pittsburgh, and in 1948 became assistant manager of the stainless-steel division.

Wickwire Spencer Opens Houston Office, Warehouse

Officials attending recent formal opening of new office and warehouse of Wickwire Spencer Steel Division

of The Colorado Fuel & Iron Corp. in Houston were: Al Rairdon, general manager of wire-rope sales, Palmer, Mass.; Jim Counter, manager of sales, Western division, Denver; Stan Jones, vice president in charge of sales, Colorado Fuel & Iron, Denver, and Jack Driggs, manager of Mid-Continent division, Houston.

Wilson Is Named President Of Los Angeles Nomads

W. A. WILSON

W. A. (Bill) Wilson has succeeded Earl Rees as the president of the Los Angeles Chapter of Nomads upon the latter's transfer to New York. Wilson is vice president of Web Wilson Oil Tools, Inc., and president of Atlas Heat Treating Corp. After graduation from Stanford in 1936, Wilson worked with Web Wilson Oil Tools until his entrance into the Army Ordnance Corps. He is also president of the Los Angeles Post of the American Ordnance Association.

Victor Made a Director Of Universal Petroleum

Universal Petroleum Co., Tulsa, has announced the appointment of Fred S. Victor to the newly created company office of director of supply and distribution.

Victor, a graduate of Oklahoma A. & M. engineering school, was with Phillips Petroleum Co. for the past 13 years, lately in the L.P.G. department at the Bartlesville, Okla., office.

Alwin F. Franz Elected President of C. F. & I.

A. F. FRANZ

Alwin F. Franz was elected president of Colorado Fuel & Iron Corp. at a recent board of directors meeting in New York City, according to Charles Allen, Jr., chairman of the board. At the same meeting, Carl W. Meyers, who has been president of Colorado Fuel & Iron since 1946, was elected vice chairman of the board of directors.

Franz has been executive vice president of the corporation since 1949, and a director since 1948. Prior to that he served as vice president in charge of operations, and has also managed two of the corporation's largest plants. Until 1945 he was general superintendent of the steel division of Alan Wood Steel Co.

Colorado Fuel & Iron Corp. operates steel plants at Pueblo, Colo.; Buffalo, and Claymont, Del., and a blast-furnace division at Birdsboro, Pa. Colorado Fuel & Iron's seven fabricating plants are located at Palmer, Clinton, and Worcester, Mass.; Mount Wolf, Pa.; South San Francisco, and Oakland.

Salmonsen to Head G-E's Industry Control Department

C. A. SALMONSEN

Carl A. Salmonsen has been appointed general manager of General Electric Co.'s newly formed Industry Control Department. The new department, with headquarters in Schenectady, N. Y., will be a component of the Switchgear and Control Division, according to an announcement by George E. Burens, division manager.

Salmonsen, a G-E employe for more than 42 years, has been manager of manufacturing of the company's former Large Apparatus Division since 1949. He first served the company as an office boy, and after completing an apprentice machinists' course, rose to assistant foreman, general foreman, and superintendent of the tool department.

In 1892 Salmonsen was transferred to the Peterborough Works of Canadian General Electric Co., Ltd., as general superintendent, and in 1930 was named manager. He has served as assistant manager of the River Works at Lynn, Mass., and in 1945 was appointed manager of the Philadelphia Works; in 1947 he was made assistant to the manager of manufacturing of the Apparatus Department, and in 1948 he was named acting manager of Aircraft Gas Turbine Divisions.

Steinkamp Heads Industrial Sales

Appointment of William H. Steinkamp as sales manager of the industrial division of Minneapolis-Honeywell Regulator Co. was announced recently.

Steinkamp has been industrial field sales manager since 1943. He succeeds L. Morton Morley, who continues as vice president of the Brown Instruments division and who will assume greater responsibilities concerning division policies and other company matters arising from the accelerated demand for industrial instrumentation.

A graduate of New York University in 1928, Steinkamp joined the Brown division in 1930 as field sales engineer, and has represented the Brown division in New York, Buffalo, Cleveland, and Pittsburgh, where he served as branch manager.

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PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 45970. P.O. Box 151, Tulsa, Oklahoma.

FOR SALE: Our Sasakwa Gasoline Plant only, "no field lines" now ready for disposal. Inventory and price available upon request Cities Service Oil Company, Patridge, Bartlesville, Okla.

FOR SALE: Wilson Giant Draw Works: 2—Buda JL-1335 Motors with chain compound: 2—Code Butane Tanks: 4 Sheave National Traveling Block: 1—HP-217 Buda Engine: 5000' 4½" Drill Pipe. All in good drilling condition. Powell Drilling Company, 306 Derby Bldg., Wichita, Kansas.

USED PUMPING UNITS and engines. One Lufkin TC-1A-54B unit with Lufkin Cooper-Bessemer engine and one O.C.S. 40 H. P. Bat unit with Superior GB engine. Both are single reduction units. Located near Kermit, Texas. Cities Service Oil Co. (Penn.), P. O. Box 1117, Crane, Texas.

FOR SALE

3—CT14L 22.5 - hp. Cabot twin - crank, used, pumping units. 54" maximum stroke, complete with U6 International engines.

1—30-hp. Ideco 54"-stroke, single reduction twin crank pumping unit, complete with 503 Fairbanks-Morse engine.

All material in good shape.

OVERTON SUPPLY CO.
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Overton, Texas

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No. 1 Used Lapweld Casing

5½" OD x 14# T&C
5½" OD x 17# T&C
7" OD x 17# T&C
7" OD x 20# T&C
8⅝" OD x 24# T&C
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Call, Wire or Write

John Pickering
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St. Louis, Mo.
Day Phone Fireside 0799
Night Fireside 0820

EQUIPMENT FOR SALE

TANKS—One 10,000 bbl. Butler Bolted Tank Standing, $5,000.00. One 5,000 bbl. riveted Tank standing, $2,500.00. Will build 10,000 back bolted. Will cut riveted tank. Build back welded on your location. Reasonable price, located Arp, Texas. Also have 210 bbl. and 250 bbl. new and used in sets with stair and walk. Lester Anderson Tank Co., Ph. 68, Box 343, Arp, Texas.

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"One of the Southwest's Leading Distributors"
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EQUIPMENT FOR SALE

7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

POWER PUMP: Rebuilt 7-P (7¼x18) Wilson-Synder, complete, oilbathed, short skids, #10657. Jones, Shelburne, Guffey, 501 N.E. 26th, Oklahoma City, Oklahoma. 5-5448.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-38 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-30 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 122—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

FRACTIONATION COLUMN and ACCESSORIES

Designed and fabricated by Braun to stabilize 6,000 bbls./day 67° API gravity crude.

Design: API-ASME code 200 psi W.P., 400° F., 375 psi Test
Dimensions: 66" x 59', .750" Shell, .750" Semi-Ellip. Heads, 30 trays on 18" spacing, Weight 47,500#
Nozzles: One 6" feed, one 3" reflux, one 8" vapors, one 8" bottom, one 10" vapor-return and two 3" relief-valves.

Heat Exchangers

Braun, horizontal, removable tube bundle, seamless admiralty tubes, cast-semi-steel body.
4—18" ID x 12', 4 pass tubes 250 psi, 2 pass body 200 psi
2—15" ID x 12', 2 pass tubes 100 psi, 2 pass body 200 psi
2—22" ID x 15', 6 pass tubes 100 psi, 2 pass body 200 psi

Reboiler

Braun, kettle type, removable tube bundle, seamless admiralty tubes, steel body, 26" x 48" x 21', 2 pass tubes 300 psi, body 200 psi at 400° F.

Steam Pumps

1—National Transite, Duplex, 8 x 4 x 12
3—National Transite, Duplex, 7½ x 5 x 10
2—Burnham, Simplex, 8 x 7 x 20

Reflux Accumulator 66" x 12'
Piping, Valves and Fittings
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Located in Wyoming

Drawings and Specifications Available

For further information please contact:

The Ohio Oil Company
P. O. Box 120, Casper, Wyoming

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FOR SALE: Ft. Worth Jumbo Spudder with or without tools. Good condition, priced to sell. Doak Drilling Company, Box 1108, Bristow, Oklahoma.

USED well drilling equipment. We buy and sell spudders, rotaries, core drills, tools, pipe, blocks, pump jacks, everything for well drilling and service. All used equipment fully reconditioned. Contact us for your requirements and save money. We rent fishing tools. Pressey & Son, Pueblo, Colo.

FOR SALE: Walker-Neer Spudder S-32 Special, complete with tailing-in tools for 5" and 7" casing. Lines extra good. Dog house, light plant, float trailer. Complete tools for drilling, running tubing, sucker rods, etc. Butane equipped. Price $15,000.00. For inventory write Box 1022, Del Rio, Texas.

EQUIPMENT FOR SALE
Franks SAL-5000 rig. 2 NHS Cummins diesel engines. Franks rotary rig 96 feet. Jackknife derrick. Provided with pump drive. Good condition. Ready for immediate delivery. Box E-726, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: New Bovaird and Company double eccentric and single eccentric pumping powers at Garnett, Kansas. For price contact A. L. Rhodes, Deep Rock Oil Corporation, Garnett, Kansas, or Joe Huitt, Tulsa.

USED 2" LINE PIPE

We are offering, subject to prior sale, approximately 480,000 feet of 2" 3.75# Line Pipe, located in West Virginia. We are inviting inquiries from dealers, as well as consumers.

Phone 5-9261, Extension 361, or write Box 2171, Tulsa, Oklahoma

PIPE FOR SALE

18 miles 6⅝" O.D. 18.97# Lapweld No. 1 used line pipe P.E.
3500' 5½" O.D. 14# No. 1 used seamless casing 8 Rd. R-2.

FRANK MORRIS & CO.
424 So. Cheyenne, Phone 2-6247 Tulsa, Oklahoma

16" OD—5/16" Wall—52# Gas Line
Excellent Quality.
CENTRAL PIPE & SUPPLY CO.
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Lubbock, Texas

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One (1) New fractionating tower, 5' 0" I.D. x 89' 6" over-all height x 1¼" plate. Thirty-four (34) bubble trays, ten (10) 18" 300# manways. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure. Located Watt Metal and Boiler Works, Houston Shops.

ROCK ISLAND OIL & REFINING CO., INC.
321 W. Douglas Wichita, Kansas
Phone 5-5674

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Good as new, for immediate delivery. One 80,000 BBL. Seven Ring all steel tank for $25,000.00. Three 55,000 BBL. Five Ring all steel tanks for $17,500.00 each. As is where is and subject to prior sale. We will also cut down and re-erect as welded tanks either of the 55,000 BBL. tanks above for $38,500.00. Or we will cut down and re-erect the 80,000 BBL. as a welded tank for $50,250.00. These are rivited tanks and of standard construction and may be inspected now near Shreveport, La. Contact by mail or phone

CLYDE DAMPF, INC.
Box 2515, Amarillo, Texas. Phone 3-5950

EQUIPMENT FOR SALE

FOR SALE: Frederick, Oklahoma, Field—5 Used 122' American Type 66M Angle Iron Derricks, Mild Steel, Cap., 246,000# 6" x 6" x ⅝" Starting, 6" x 6" x ⅜" Running legs, with floorable platform, safety top and crown block. Standing. $750.00 Each. Cities Service Oil Co., Patridge, Bartlesville, Okla.

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WELL SERVICING UNITS—Skid type, Single Drum Cardwells, Wilsons, Allis-Chalmers, Muskogee, Keltner. Double & Single Pole Mast. Have Draw Works on long skids w/ 86' Double Pole Rotary Mast for shallow well rotary. For sizes & prices—Write General Tool & Supply Co., P. O. Box 4387, Oklahoma City.

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FOR SALE: Well Drilling Business—71 Star, Modernized #3 Keystone, Both Truck Mounted. Complete Tools, 4 to 20 inch. Physical Inventory $15,000. Nets $6,000 to $8,000 yearly. This is Industrial—No Pipe Worries. Sales Price: $11,000.00. Owner retiring. Write Box E-594, The Oil and Gas Journal, Tulsa, Oklahoma.

GEO. FAILING core drill unit, Model 44, mounted on Ford truck. Complete with pipe and equipment. Kelly Heyen, Dorchester, Ill.

FOR SALE: Good 3½" and 4½" OD Drill pipe. Two EKU Waukesha's, One RL Cardwell, Hercules Engine, Tanks, Treaters, Pumping units. Rogers Pipe & Supply Co., 620 Wright Bldg., Tulsa, Oklahoma.

FOR SALE: 71 Speed Star Drilling Machine, good condition, mounted on K-7 International Truck. Tools 8" and smaller. Doghouse mounted on trailer with 4-cyl. Kohler lighting plant. 1950 Ford truck with Tulsa winch, gin poles. Immediate delivery. Harold J. Shuck, Burnips, Michigan. Phone Jamestown 3495.

CATERPILLAR D-13000 Power Unit, open Clutch, Outboard Bearing. Rebuilt, priced right. Martin Tractor Company, Chanute, Kansas. Phone 73.

280 TONS OF USED PIPE from 2" to 12", two 55,000 barrel and two 37,500 barrel oil storage tanks, several small steel tanks, large oil engines and other scrap material located at Interstate Oil Pipe Line pump station, De Queen, Arkansas. Inspection and bids invited. Contact J. E. Wommack, Chamber of Commerce, De Queen, Arkansas.

FOR SALE at our Oklahoma City Warehouse, Three 9½" x 14" VTH Used Clark Compressor Cylinders from angle compressors. Cities Service Oil Co., Patridge, Bartlesville, Okla.

WELL Drilling Rotaries and Spudders, bought and sold. Immediate delivery in most cases. Specify your requirements. Contact Francisco Gonzalez, Baker Export Co., Box 1128, Pecos, Texas.

MOUNTED Rotary Drilling Rig, Dodge Truck. Complete 2000 foot capacity. Two men operate, fast, durable, efficient, roller-bearing throughout. Money maker shallow drilling, reverse circulation, clean-out. Box 106, Seminole, Oklahoma.

EQUIPMENT FOR SALE

25,000' 2" P. E. LINE PIPE
FOR SALE: 25,000' 2" P. E. line pipe excellent for oil and gas lines priced way below OPS ceilings. Contact Edco Pipe & Supply Co., 45970, 310 Tuloma Building, Tulsa, Oklahoma.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. George R. Milner, Box 134, Okmulgee, Oklahoma.

25 KILOWATT Fairbanks Morse 125 Volt Direct Current Electric Generator driven by Model D-382 Le Roi Gasoline Engine, complete with Electric Start, Fuel Tank and all Accessories. Mounted on Steel Base and with Panel Board. Weight Approx. 3500#. Unit reconditioned and guaranteed—$2,000.00 FOB Houston, Texas. Halloran Equipment Co., 5702 Harvey Wilson Drive, Houston 20, Texas.

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FOR SALE: 36,000' 1¼" ID 3# PE SH Amonia pipe, regular random lengths, good condition. Richardson Supply Corp., 401 North Main, Tulsa. Telephone 3-6522.

USED rotary and cable tool drilling tools. E. A. Kelly, Box 861, Oklahoma City. Phone 5-6407.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WANTED—Cardwell Trailerig, Box 1137, San Antonio, Texas.

WANTED—125-150 horsepower boiler 300# working pressure. Must be in good condition. Contact Leo Ekstrom, Anchor Gasoline Corporation, 714 Atlas Life Building, or phone 54-5201, Tulsa, Oklahoma.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED: Large Servicing Unit in good condition at once. Cardwell L or similar size Franks or Wilson. Preferably truck mounted. Phone 4093, 407 West 12th St., Lawrence, Kans.

1,400 FEET or less 3½" EUE or 2⅞" EUE drill pipe, new or good used. One 30 foot 4¾" drill collar, new or good used. Have PAD authorization for pipe. Box E-606, The Oil and Gas Journal, Tulsa, Oklahoma.

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Electric Motors
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WANTED

Good used 10"-10¾"-12"-12¾" OD light weight Plain End line pipe: 5½" OD 8 thread line pipe T&C: 5½" OD 10# or 13# T&C Casing; 6" OD 10# or 13# T&C Casing; 6¼" OD 13# T&C Casing—all items for water well casing purposes.

CENTRAL PIPE & SUPPLY CO.
Box 1466—Phone 58851
Lubbock, Texas

EQUIPMENT WANTED

WANTED: 12,000' 7" OD 17# New Plain End Pipe. 7,500' 6⅝" OD 13# New Plain End Pipe. Public Service Corporation of Texas, 1002 Continental Life Bldg., Fort Worth, Texas.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

PETROLEUM ENGINEERS, Geologists, Draftsmen, and many other openings in the Rocky Mountain Area. We bring employer and employee together, match ability and experience with job requirements. For furthur information write Professional Placement Service, 516 University Bldg., Denver, Colo.

NOW READY. List showing where to apply for foreign jobs with oil companies and general contractors. Write for price. OIML Co., Box 2603, Tulsa, Okla.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-618, The Oil and Gas Journal, Tulsa, Oklahoma.

RAPIDLY expanding Company wants College graduate for Oil Country sales job. Must be between 27 & 35 years of age. Write stating qualifications and present position. All replies confidential. Box E-735, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE DESIGN ENGINEER

To head Petroleum, Chemical, and Petro-Chemical Design Section of long established, progressive engineering-construction firm with headquarters in Southwest and operating internationally. Compensation to suit experience and ability. Must have proven record in directing work of others and dealing with major clients. Age minimum 35. Submit recent photograph and full education and business history. Replies held in strict confidence. Our staff advised of this inquiry. Address replies to Box E-729, The Oil and Gas Journal, Tulsa, Okla.

Scheduling Engineer

Major petroleum refinery construction company located in New York has excellent opportunity for outstanding Scheduling Engineer with minimum 3-5 years' experience in job scheduling on petroleum or chemical plants: starting with engineering and proceeding through procurement and construction. Please submit complete resume, including past earnings record. Your reply is confidential. Our employes know of this ad.

Box E-729
The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

WANTED: An oil Driller to drill in Michigan and Arkansas on 49:51 share. Wonderful prospect in Arkansas, near El Dorado Oil Fields. Individual preferred, rather than Company driller. Would also like drilling Equipment on Rental Basis. H. C. Wells, 4732 Prairie Ave., Chicago, Ill.

LEASE & TITLE MAN: Major Company, Illinois Basin, College education preferred, but not essential if experience adequate. Permanent position. Box E-727, The Oil & Gas Journal, Tulsa, Oklahoma.

MEN to train for service engineer to service hydraulic oil well pumping equipment in California oil fields. Experience in servicing oil field mechanical equipment essential. Some engineering education desirable but not essential. Excellent future for men selected. Give full details of experience in first letter. Box E-719, The Oil and Gas Journal, Tulsa, Okla.

CONSTRUCTION ENGINEER

Exceptional opportunity for a graduate engineer with definite experience in managing refinery construction and maintenance, preferably in Fluid Catalytic Cracking Plant. Apply Northwestern Refining Co., P.O. Box 248, St. Paul Park, Minnesota.

EXPERIENCED Rotary drilling rig mechanic for central and south Louisiana operations. Tools and transportation furnished. Top salary. Give details in first letter which will be kept confidential. Box E-730, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Building, Tulsa, Okla., 4-5974, Tom Robinson, owner. For technically trained personnel. No Fees. Confidential. Needed now. Landmen with law degrees under 3 years experience. Geologist sufficient experience to head Geological Department. Substantial Ind pendent.

WANTED: Combination Safety Engineer and Metal Inspector. Southwest Refinery. Box E-681, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

RESERVIOR ENGINEERS

Major Oil Company has openings in Venezuela for qualified Reservoir Engineers. Age 26-40, B.S. in Petroleum Engineering or equivalent. 5-7 years' exp.

Write giving full details to:

P. O. Box 35

Bowling Green Sta., N. Y. 4, N. Y.

OPPORTUNITIES FOR TECHNICAL REFINERY PERSONNEL for LARGE INTERNATIONAL OIL COMPANY

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

Box E-667, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

EXPERIENCED oil field mechanic, gas, butane and Diesel engines, good references. Box E-734, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 1638. Ph. No. 131, Hobbs, New Mexico.

PRODUCTION MANAGER. Petroleum Engineer-Geologist. 38. Experienced land and leasing, negotiating drilling deals and contracts, and management drilling and producing operations in Kansas and Rocky Mountains. Desire responsible connection with active and financially sound operator. Box E-679, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER desires connection with independent refiner in supervisory capacity. Fourteen years experience with major company. Familiar with all phases modern refining. Master's degree in Chemical Engineering. Age 36. Box E-714, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST: 5 years' experience, surface, reserve estimates, subsurface, Venezuela, desires position Rocky Mountain Area. Age 31, married, references. Box E-723, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Engineer, Master's degree, desires supervisory position with independent refiner or related industry, over ten years' experience in refining and natural gasoline field. Age 36. Box E-732, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Superintendent, experienced 5,000 to 10,000 bbl. plants, desires connection with independent refinery. Box E-696, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

ACCOUNTANT

College Graduate, Married, Age 40. Experience includes oil, gas and public utility accounting: Federal and State income taxes; manual and machine accounting systems and procedures; and office supervision. Present position as Assistant Auditor offers no opportunity for advancement. **Box E-721, The Oil and Gas Journal, Tulsa, Okla.**

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1906. Oil-Gas (all states), Business, Real Estate. Legal Forms, Leases, Revised With Government Regulations, Commercial Printing Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, Oklahoma.

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Send for list. Can offer Williston Basin minerals for $10 per acre with $1.00 annual rentals. Can sell in minimum tracts of 40 acres. Solicit sales only to those connected with oil or royalty business. References exchanged. Write or call Milburn & Milburn, Sewell Building, Telephone 6-6439, Odessa, Texas.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

OIL PROPERTIES; farmouts. Lease surrounded by production. Box 6008, Dallas, Texas.

WILL SELL Quarter interest in 80 acre shallow oil lease, northeast Oklahoma, for $750 to finance pumping equipment. Many years' experience. Good references. Write Box 450, Muskogee, Oklahoma.

PRODUCTION WANTED

Principals want to purchase production in Kansas, Oklahoma and Texas or corporate control of producing company operating those states. Inquiries invited from owners or responsible representatives.

Box E-731
The Oil and Gas Journal
Tulsa, Oklahoma

PRODUCTION FOR SALE

We have several producing oil leases for sale in West Texas, on which there are many proven locations. Will furnish details to qualified buyers only—no brokers or promoters.

Box E-713
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

NEW MEXICO
ROOSEVELT & DEBACCA COUNTY

Three important wells to be drilled on Seismograph structures. One well located within ½ mile of indicated San Andreas producer. Data covering these potential Oil & Gas Fields furnished interested operators and investors.

W. J. PETERMAN, GEOLOGIST
809 S. Chicago Portales, New Mexico

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Inquiries Invited

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6631 Delmar Ave., St. Louis 5, Mo.

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Major Oil Companies and a large number of progressive independents are making a great lease play in certain areas of Western Kansas, and we have some well located leases and royalties right in with and under the big company spreads. Here is the small man's chance to be in on the ground floor of a 'big company' play. Write us for full details.

ACACIA OIL & ROYALTY CO.
P. O. Box 881
Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

TWO LOTS north outskirts Snyder; two north outskirts Oklahoma City; one each Stanton, Latt, Quanah, Texas. Want drilling. V. A. Epps, Pioneer Hotel, Tucson, Arizona.

PROFIT participation offered to party submitting acceptable deal with shallow possibilities suitable for secondary recovery. Informant's name treated confidentially if desired. Contact SITCO, 801 Dallas National Bank Bldg., Dallas, Texas.

FOR SALE: Four oil and gas leases in shallow territory, two large leases excellent for water flooding, all in Allen County, Kentucky. Buel Wilson, Box 184, Scottsville, Ky.

WE invite inquiries from persons interested in Oil and Gas Leases in Southern Alberta, North Central Montana and the Williston Basin. Box E-664, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR LEASE: 3500 acres oil and gas land in Corbin, Sweetwater and Fremont Counties, Wyoming. Will sell equity. Write Joseph L. Lincecum, 817 W. Pine, Rawlins, Wyoming.

MINERAL Deeds for sale McKenzie County and other areas North Dakota. Reply to Box 941, Houston 1, Texas.

WANT TO PURCHASE all capital stock of oil or gas company, showing operating loss, must be corporation. Box E-716, The Oil and Gas Journal, Tulsa, Okla.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

REAL ESTATE

FOR RENT: Ideal Building with Apartment for Oil Field Supply. Good field. Little competition. Best location. R. H. Morey, Virgil, Kans. Phone 501.

FOR SALE: Beautiful Colorado mountain home. 3 acres at foot of Mt. Princeton. Stream and trout lake on property. New modern log house. Attached garage. Oak floors, picture windows, heatalator fireplace in 12x26' living room. Thermostatically controlled gas heat, hot water, gas range, refrigerator. Completely furnished. Price $15,500. Contact owner, R. J. Illeman, Box 158, Dewey, Okla.

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

FORT WORTH

FOR SALE ATTRACTIVE fourteen room residence containing six bedrooms, bar and card room, morning room, game room, partial **air conditioning**, central heat. Beautifully landscaped. In perfect condition and located in Fort Worth's best residential area. **Detailed Brochure furnished on request.**

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SERVICES

FLUORESCENCE measured accurately. Mail soil samples in small bottles, carefully numbered. Make your own map. Include it if you wish my comments. Return report next day. One dollar per sample. P.O. Box 630, Stillwater, Okla.

BUSINESS OPPORTUNITIES

EAST OKLAHOMA Hydrofrac Prospects Geologist and company manager have data on shallow sands with employers permission to use. Are interested in venture with reliable parties to develop. Others please do not inquire. Box E-725, The Oil and Gas Journal, Tulsa, Oklahoma.

WANT
N. Y. EXPORT REPRESENTATION?

Long established and well known oil well equipment manufacturer who has maintained N. Y. export office and sales personnel for many years, is now in a position to handle additional representation in New York for high quality manufacturers of oil equipment items. If you're looking for increased export business, write for further information. All replies held in strict confidence.

Box E-359, The Oil and Gas Journal, Tulsa, Oklahoma

Production Meeting Set

AUSTIN. — Successful methods of recovery of oil will be outlined by several speakers at the Fourth Oil Recovery Conference, to be held in Hogg Memorial Auditorium here May 8 and 9.

This conference is sponsored by the Texas Petroleum Research Committee.

Papers to be presented include:

"Application of Surface Chemistry to the Recovery of Oil," by L. O. Morgan and Norman Hackerman, University of Texas, and H. J. Prusick and Paul D. Torrey, Oil Recovery Chemicals, Austin; "High-Pressure Gas Injection in the Block 31 Devonian Reservoir, Crane County, Texas," B. L. Griffith and V. M. Hollrath, Atlantic Refining Co., Dallas; "Increased Oil Recovery Due to L.P.G. Injection," Harvey T. Kennedy, Texas A. & M. College, College Station; "Engineering Study of the Cook Ranch Field, Shackelford County, Texas," Wallace W. Wilson, Continental Oil Co., Ponca City; and "Economic Aspects of Cycling Gas-Condensate Reservoirs," H. G. Riley and C. M. Cole, Jr., of Stanolind Oil & Gas Co., Tulsa.

Attapulgus Interest Sold

NEW YORK. — Standard Oil Co. (N. J.) has sold its 50 per cent interest in Attapulgus Clay Co. to Eberstadt & Co., Inc., and Lazard Freres & Co.

The other 50 per cent interest in the company is owned by Atlantic Refining Co. The purchasers of the Jersey Standard share announced they will hold their interest for investment.

Attapulgus and Filtrol Co. of California jointly own Filtrol Corp., which makes absorbents and decolorizing agents, cracking catalysts, and packaging desiccants. Attapulgus makes fullers earth products for lubricating-oil filtering. Attapulgus also has equal

ownership with American Cyanamid Co. in Porocel Corp., which makes activated bauxite products for the decolorizing and purification of oils and waxes.

Rubber Freed

Federal controls lifted for first time in decade

WASHINGTON.—The rubber industry, under federal control longer than any other manufacturing industry in the country, has been freed of practically all regulation as the result of a building up of a large world supply of both natural and synthetic.

For the first time in 10 years manufacturers of rubber products may use as much natural rubber as they wish, with the exception of pale and sole crepe, two types which remain in short supply.

With its order eliminating controls, the National Production Authority disclosed that the Defense Production Administration has fixed the minimum annual-consumption level of synthetic rubber at 450,000 long tons of GR-S and 60,000 long tons of butyl.

RFC assignment.—DPA also has directed the Reconstruction Finance Corp. to produce GR-S at an annual rate of not less than 600,000 long tons until, in addition to meeting all other requirements, a government stock pile of at least 75,000 long tons has been accumulated. Thereafter, GR-S output may be reduced to 450,000 long tons a year, provided the stock pile has been increased to at least 122,000 long tons.

These inventories, according to NPA Administrator Henry H. Fowler, would be sufficient, as a supplement to production, to enable the RFC to supply the industry at the full GR-S capacity of 860,000 tons a year during the period needed to get the plants back into actual production at that rate in the event of an emergency.

Consumption rate.—Fowler said, however, that GR-S consumption now is running at a rate of over 700,000 tons a year and butyl at more than 80,000 tons. This indicates there is little chance that synthetic consumption will drop to the 450,000 and 60,000-ton levels.

While the industry will be free to use natural rubber as it pleases, it is expected the consumption of synthetic will be maintained. If this is not done voluntarily, the Government has standby specifications for mandatory consumption which could be put into effect if needed to provide adequate security in the production of synthetic rubber.

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"Look, young feller, jest why should I lease to you when your company already has a contract to drill this quarter to the Wilcox, and your exploration department has two crews out, your block won't be complete without my acreage, and besides A.B.C. oil offered more!"

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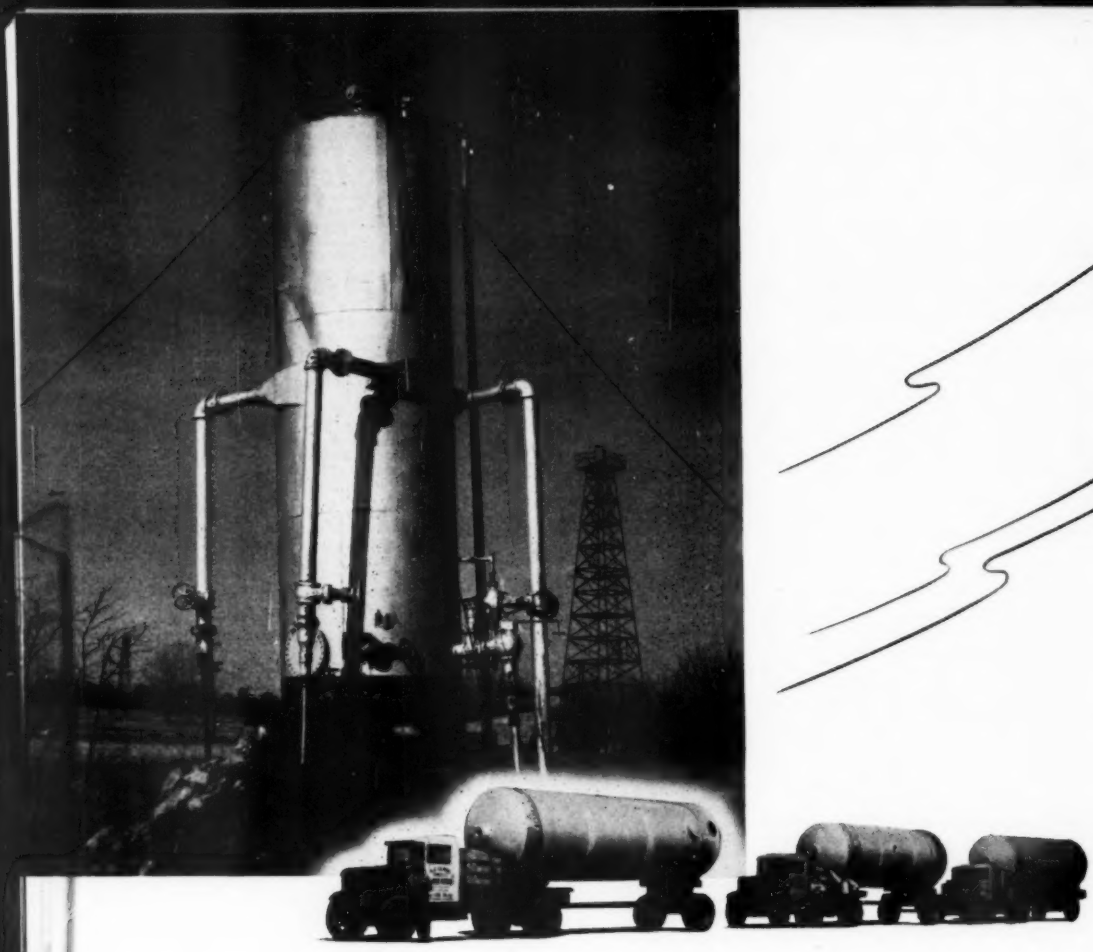

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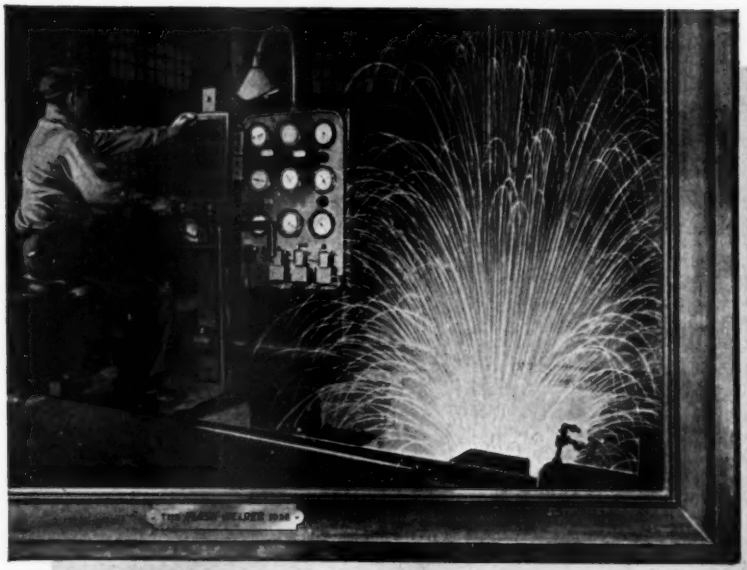

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